IRON AGE

FEBRUARY 14, 1952
VOL. 169, No. 7

THE IRON AGE
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DIGEST

of the week in metalworking

STEEL SPOKESMEN THROW A COUNTERPUNCH
PAGE 83
The union and the Administration had backed the steel industry into a corner and were giving it a lambasting. But last week its spokesmen at wage hearings counterpunched hard. They showed no willingness to trade concessions for abuse and wanted blame for inflation put on proper parties.

TOOL, DIE SHOPS MULTIPLY IN THE WEST
PAGE 84
War plants' heavy tooling orders for jet planes, guided missiles, and electronic equipment have pushed West Coast tool and die shop expansion into a gallop unmatched by any of the traditionally large centers. This was brought out at a first Los Angeles meeting of the toolmakers.

STRUCTURALS — YOU'LL GET THEM SOONER
PAGE 85
Contractors must hunt harder and shave bids to get new jobs today. Volume of new structural inquiries has fallen sharply in recent months. But delivery of structurals is quicker than it was a year ago. If you have a Washington okay you can get steel in 6 to 9 months—an improvement.

STEELMAKERS SEW UP COKE COAL RESERVES
PAGE 87
More of the known coking coal reserves in western Pennsylvania are being sewn up by steel producers. Reasons are growing steel capacity and a desire to make sure that this metallurgical coal will be used for coke. Known reserves of top quality coking coal are showing signs of petering out.

DON'T BE OPTIMISTIC ON UNEMPLOYMENT AID
PAGE 101
Mobilization officials are hedging against over-optimism that may develop from plans to relieve unemployment in "distress areas" by placing "higher" price contracts. Autos, textiles may benefit to a limited degree, Washington says. Caution against shifting burden is in order.

CAN'T SOLVE AUTOMOTIVE LAYOFFS EASILY
PAGE 106
When the smoke of investigation had cleared after last week's flying visit of the Government Task Force there was still no pat solution to Detroit's unemployment problem. Government men heard plenty of suggestions: (1) That discrimination against autos end, (2) Boost auto output.

WEST COAST STEEL MARKET IS SOFTENING
PAGE 111
While still not in abundant supply, steel in the West is easing. Mill salesmen are calling customers for CMP tickets, and bars and structurals are available. Flats are still tight, but they can be found, too. Demand for cast iron has dropped, with some grades of scrap below ceilings.

TOOLING INNOVATIONS FOR SMALL PARTS
PAGE 123
Here are small parts tooling ideas from Buick, both on mass-production and on small-lot jobs. A simple rig replaces a pitch-line chuck in gear production. A special machine burrs holes on 8000 small pieces an hour. A simple screw-machine pickoff device prevents finished part damage.

GAS HOT-TOP HEATING BOOSTS INGOT YIELD
PAGE 126
The latest and possibly the best answer to the old problem of hot-top size, is heating with oxy-natural gas. Up to 10 pct increase in ingot yield is reported and the hot-top weight has been materially reduced. High alloy and stainless steel ingots are now being poured using this method.

SAE CHARTS OF HEAT TREATABLE STEELS
PAGE 130
Selection of substitute steels has been simplified with new metallurgical tables prepared by the Iron & Steel Technical Committee of the Society of Automotive Engineers. Based on section size and quenching medium, Ordnance has OK'd the charts for products not covered by other specifications.

STEEL IS EASIER DESPITE STRIKE THREAT
PAGE 173
Threat of a steel strike normally turns the market into its tightest state. It's different this time. Controls over use are causing the market to soften in spite of labor uncertainty. Also belief that production must be maintained persists in face of the growing chasm between steel, labor.

INVESTMENT CASTING GATING, TURBULENCE
NEXT WEEK
Flask temperature does not affect hardenability or tensile strength of 4140 and other alloy steels studied at Arwood Precision Casting Co. Investment casting quality is tied to gating designed for minimum turbulence. Proper gating produces cleanest castings, least scrap; minimizes inclusions.

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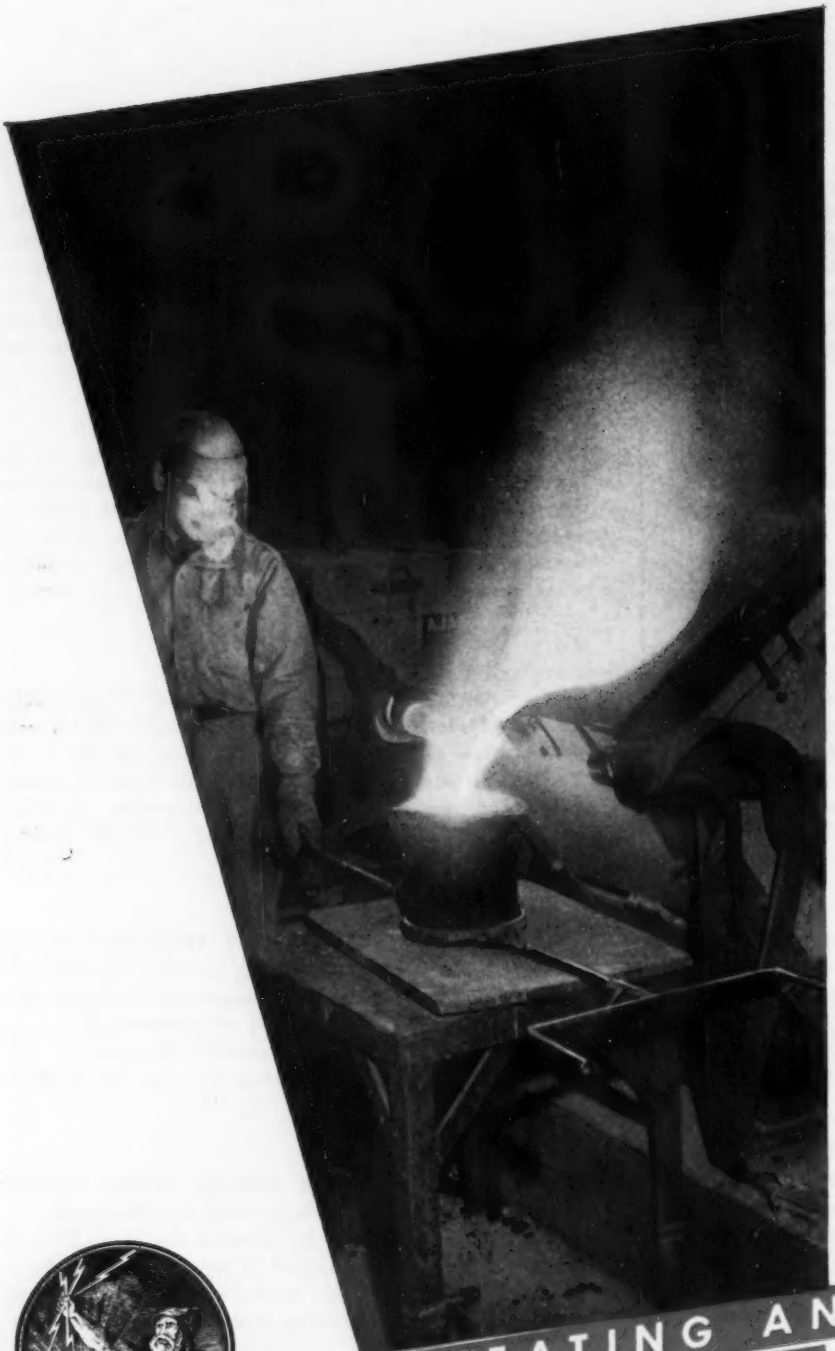

High speed melting enables Ajax-Northrup high-frequency furnaces to recover all of the nickel in the charge, 99% of the chromium, 95% of the molybdenum . . . consistently high percentages of every alloying element.

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The Iron Age
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Steel Labor Follies: Act II

PLAYING to a full house, the "Steel Labor Follies of 1951-1952" has been quite a show. As part of its props it had two letters from the President of the United States.

At Atlantic City, a little more than a month ago, a frenzied benefit performance was put on for the rank and file. At that Steelworkers' convention showing, the language really got lusty. Here is a gem from Mr. Murray's script:

"The Corporation's proposals constituted no more nor less than a diabolical scheme to Sovietize the loyal workers in the steel industry. In its greedy lust for profits and for absolutist powers, the Corporation has the unmitigated gall to adopt the very methods used against forced labor by dictatorial rulers in totalitarian countries. Steelworkers of America will never accept the Stakhanovite working conditions imposed on workers behind the iron curtain."

Act II has been playing Washington and New York for several weeks. One critic called the steel panel a "ways and means" panel—a panel to find ways and means to give the labor actors what they want and still have it sound legitimate. Others have called the second act somewhat less than droll window dressing.

Even the panel of experts listening to the script knows what the climax will be. Steel industry players feel that the "show must go on" but they too know what the climax will be—no curtain calls for them. They know what the denouement won't be.

Press notices on "Steel Labor Follies 1951-1952" have been slipping lately. Maybe the audience is getting a trifle cynical. They have seen this play in its identical form in 1944, 1946 and in 1949. The stage is always set against the steel actors who get short-changed.

At the proper moment the Washington "angels" (you know whom) will step in and ring down the curtain. Everybody knows this, so the excitement and breathlessness registers about the same as a twentieth reading of Ivanhoe.

The play should be called "The American Travesty."

Tom Campbell

Editor

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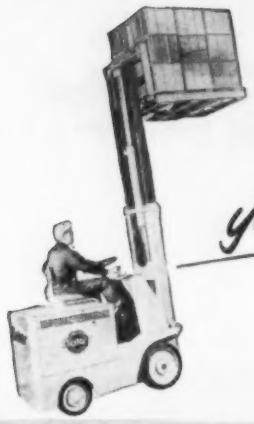

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Dear Editor:

Letters from readers

More About Conformity

Sir:

Your editorial "What Price Conformity?" of Jan. 24th is extremely interesting. In the next to the last issue of *Life* magazine under Letters to the Editor there were a great many interesting comments from people regarding an article along the same lines.

One woman stated that she burned two of her husband's shirts while ironing before she could calm down after reading the article. My wife's comments are not fit to print. My own comments boil down simply that the office is one side of your life and the home is the other and neither one should get involved with the other. About the only thing you have left is the privacy of your own home and conversation with someone who isn't influenced by a million and one things that go on in business.

Your remark about the four letter word is fascinating as there are a great many four letter words. As my father always says, you still have the right to choose your friends after 5 o'clock. There is a small rule of thumb which I use and that is—when a woman starts to tell me how good her husband is, I start to look at his record.

NAME WITHHELD
President

— Steel Co.

Steel Specs

Sir:

It has come to our attention that you ran a very complete and valuable tabulation on high temperature alloy steels approximately 2 years ago. We understand that this tabulation gave a cross-reference on the various type of specifications such as AISI, ASME, SAE, etc.

We would appreciate two copies of this report if it is still available.

J. DUSTMAN
Chief Sales Engineer
Detroit Broach Co., Inc
Detroit

The article you want is out of print but we do have a new "Digest of Ferrous and Nonferrous Alloy Specifications" which is available at 25¢ per copy.—Ed.

Croning Process

Sir:

Would you kindly give us any information you might have about the shell molding process. We have heard only rumors about this supposedly new and revolutionary method of manufacturing.

E. CALLEN

Callen Mfg. Corp.
Maywood, Ill.

Among the articles we have published on the shell molding processes are: "Machines Make Shell Molds," Apr. 19, 1951, p. 81; "Detroit Spending Millions on Foundry Processes," Aug. 3, 1951, p. 89; "Resin Makers Push Croning Process," Nov. 15, 1951, p. 120; "Jobbing Foundry Adopts C-Process," Nov. 15, 1951, p. 111.—Ed.

Inspector's Dilemma

Sir:

On p. 63 of your Jan. 10 issue you have published a very appropriate cartoon.

This "Bull of the Woods" cartoon depicts very realistically the quandary of an inspector. For this reason we should like to obtain 10 copies of the picture to distribute intradepartmentally.

H. D. TURNER
Supt. of Inspection Dept.

Lukens Steel Co.
Coatesville, Pa.

Laminating Resin

Sir:

On the Newsfront page of your Jan. 17 issue you mention a laminating resin having considerable temperature resistance. Where can we secure further information on this material?

M. HILL

SKC Associates
Paterson, N. J.

Write to the U. S. Rubber Co., Rockefeller Center, New York 20, N. Y., for more details.—Ed.

Translation Difficulties

Sir:

In your Mar. 15, 1951 issue you published a translation of an article by this writer, "Cold Extrusion of Steel." The original text appeared in the July/August 1950 issue of the "Archiv Fur Das Eisenhuttenwesen," a publication of the German Society of Ferrous Metallurgists.

Since the translator, W. M. Baldwin, of the Case Institute of Technology, did not contact the author, as is customary, the translated article has only recently come to the writer's attention.

In the introduction of the original text it is stated that the article is based upon the results of investigations which were carried out in cooperation with H. J. Pessl, metallurgist of Lake Erie Engineering Corp., Buffalo.

H. HAUTTMANN

Vereinigte Osterreichische Eisenund Stahlwerke A.G.
Linz, Austria

Our apologies to Mr. Pessl.—Ed.

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THE IRON AGE Newsfront

► Structural steel allotments for roads, schools and hospitals are due to be increased. Construction of new industrial capacity is nearly half completed, will be two-thirds finished by year's end. Structural producers' backlogs are shrinking, inquiries are drying up and builders are bidding on some jobs at cost.

But a big factor here is political pressure in an election year. First relaxations will be slight but by December the gates will be open fairly wide.

► Because of the continued shortage of nickel the lean alloy TS steel grades recently developed by the AISI and the SAE may have to be changed. These grades did not contain boron. Under revised thinking the use of boron grades containing no nickel will receive much more impetus.

► NPA is expected to soon issue a limitation order on the use of resin bonded diamond wheels for off hand grinding. This will help conserve U. S. supplies of industrial diamonds but will prove a dismal headache in many plants until they can swing over to other types of grinding wheels or methods of grinding.

► In the initial tests of hot extrusion of stainless steel tubing, extrusion speeds of about 800 ft per min. have been reached.

► One Midwestern manufacturer has found it possible to double output of a line of punch presses through use of easily adjustable variable speed drives. The gain comes because the operator can set press speed to suit his own ability. Many work faster than former fixed speed. Other less agile workers slow down but contribute to increased output due to less fatigue, fewer rejects.

► If steel industry profits are further squeezed by the wage price settlement, it might backfire on the government's "moral suasion" to get the industry to shift its product mix. Plates and structurals (which Washington wants) are generally only half as profitable as the average of all steel products. Sheets and strip are of course above the average.

Specifically, one steel company last year averaged 5.1 pct profit on sales of all steel products but only 2.5 pct on structurals.

► Washington apparently intends to credit aircraft production cutbacks to a desire to impose less strain on civilian goods production and manpower. Look therefore for additional efforts to make political hay out of a cutback that stems more from faulty plans and estimates than anything else.

► Industrial applications of electronics have sometimes been criticized because of tube failure—which has often been due to vibration or temperature factors. Current research is designed to supply automatic alternates and fewer tubes while improved production methods make them stronger.

► For aircraft speeds above 600 mph and 45,000-ft altitudes, the Navy is working on an escape capsule, fully enclosed, to catapult pilots clear of their craft. The new unit, now being given ground tests, is pressurized and oxygen equipped. It can be heated, has its own parachute and life raft.

► Preliminary tests by Armour Research Foundation indicate that a considerable saving in capital investment for taconite beneficiating equipment may be realized from a new process for softening the ore before milling it.

NEWSFRONT — NEWSFRONT — NEWSFRONT
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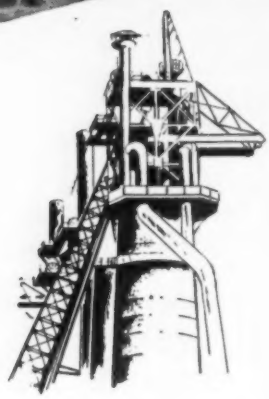

EC&M Skip-Hoist Controller Helps Speed Round-the-clock Charging

Expected furnace capacity at the time of construction was 1250 tons per day or 38,750 tons a month. A recent month's output was over 50,000 tons (nearly 30% above the planned capacity). Contributing to increased output is the high speed operation of this skip-hoist made possible by the many advantages found in the EC&M Rheostatic Method of Control. These are:

1 **Adjustable control**—allowing up to double the running speed on the straight part of the track for reduced charging time. Full field strength and maximum torque for acceleration, and at slow down for accurate stopping—either with an empty bucket or capacity ore load.

2 **Low initial investment**—and low standby renewal part inventory.

3 **Simple construction**—easily inspected with minimum labor and upkeep expense.

4 **Safe, smooth operation** under all conditions of stone, coke or ore loads.

Consult with EC&M, without obligation, when considering control for blast furnace distributor-tops, bell-hoists, skip- hoists, etc.

NO DELAYS IN 8 YEARS

This is but one of several blast furnace skip-hoists used by this large steel maker and equipped with EC&M LINE-ARC Contactor Control. EC&M has recently built additional controllers for two new blast furnace skips for this company.

THE ELECTRIC CONTROLLER & MFG. CO.
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The Iron Age
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News Section

STEEL: The Whipping Boy Fights Back

Won't turn other cheek, hits back . . . Doesn't want blame for threatened inflation or for strike . . . Both sides seek favor in public opinion . . . Total demands near 60¢—*By W. V. Packard.*

The steel industry, which had been taking a lambasting from labor and government, started slugging back last week. As usual, it was on the defensive. But, this time, the industry showed no willingness to turn the other cheek by trading concessions for abuse. It started stating its own case in a loud voice—meeting fire with fire. The erstwhile whipping boy was aroused.

Above all, the industry was making certain of one thing: No matter what settlement was to end the wage-price impasse, steel would not be blamed for shattering the stabilization program and opening the floodgates of ruinous inflation.

If a sizable wage increase were forced on the steel companies with no hope of a compensating price increase, there would be a strike. If wages and prices were both advanced the industry would do its best to make the economy strong. But the warning was clear: The union and the Administration would have to share the blame for scuttling stabilization efforts and setting off a chain of cannon crackers that would blow inflation throughout the economy.

Favor Holding Firm—What did the steel companies favor? Holding the line, with no wage increase and no price increase. But it was obvious they entertained little hope their view would prevail over the alliance against them.

As the public hearings before the Wage Stabilization Board panel droned on, and a parade of witnesses submitted volumes of statistical evidence, it became increasingly clear that neither side had much hope of convincing the other—of anything. Both hoped to influence the decision of the panel. But their remarks were even more directly aimed at the sounding board of public opinion.

John Stephens and Phil Murray at Washington hearings later continued in New York. Stephens asked "the same courtesies we afforded you."

The sixth round steel wage fight had in fact become a battle of public relations. Both the United Steelworkers of America and the steel companies know that public opinion, especially in an election year, is their main hope of forcing a government decision more favorable to them.

Steel industry testimony made the union's "modest" demands stand out in gigantic, bold relief. Fringe benefits would cost nearly 40¢ an hr—more than double the 18½¢ per hr wage boost being sought. These hidden costs raise the total of wage demands close to 60¢ per hr.

Fringe costs were broken down like this: Higher shift premiums, 4.13¢ per hr; higher overtime and premium pay, 24.6¢ per hr; more paid holidays and higher premiums for holiday work, 6.46¢ per hr; longer vacations and shorter required service, 4.5¢ per hr. Total, 39.69¢ per hr.

Cite Precedents—Company testimony also scored other fringe demands as an attempted invasion of management prerogatives. These demands involve job change or termination, job description and classification, incentives and performance requirements, seniority.

The union contention that it could receive as much as 34¢ an hr under present WSB regulations drew heavy fire. Board decisions and case histories were cited to show that the union is not entitled to anything more than could be justified on the basis of higher cost of living.

Productivity, another point at issue, should benefit stockholders and the public at large, as well as labor, the testimony brought out. Stockholders should benefit because they furnish money for tools to raise productivity. The public should benefit through lower prices.

The union bid to eliminate southern wage differentials was viewed as "catastrophic" in its implications. Removing this differential of 10¢ an hr would raise southern wage bills nearly $6 billion because it would destroy differentials in other industries, too, it was pointed out. The panel was told such a concession would blight all of southern industry.

Ask Courtesy—The vast testimony rolled on through the week with slight interruption. Occa-

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sionally, Phil Murray broke in to dispute a witness by question. Once, panel head Prof. Harry Shulman of Yale Law School told the witness he didn't need to answer. Another time John Stephens, vice-president of U. S. Steel requested the same courtesies which "we" afforded the union on its presentation.

After recess on Monday and Tuesday of this week, company testimony is tentatively scheduled to be concluded on Wednesday and Thursday. Union rebuttal would then come on Friday and Saturday. Parties are hopeful of conclusion by Saturday.

The panel would then make recommendations for settlement. Neither party is bound by the panel's findings. The strong bid for public opinion by both sides indicates the real threat of a strike if agreement cannot be reached before Feb. 24, although the President could still forestall it at the eleventh hour by invoking the Taft-Hartley Act.

WSB Studies Copper Pay Demand

Wage Stabilization Board is considering a special panel recommendation that 13 copper and brass fabricating firms in New England and the Midwest meet labor union demands for a 15¢-per-hr wage increase.

A cost-of-living escalator clause and annual productivity raises also form part of the proposal. These would be written into contracts if the union involved, United Automobile Workers-CIO, agrees to extend present agreements into 1955.

According to the union, it represents 30,000 workers in the industry. Federal Mediation Service, however, puts the total at 15,000.

Fear Steel Pattern in Pay Rise

Industry is afraid it sees a possible pattern for the government's labor peace formula in steel in a report of a Wage Stabilization Board special panel recommending wage increases of 14.4¢ per hr for 11,500 workers at two Wright Aeronautical plants in New Jersey.

Prof. Harry Shulman, who wrote the Wright report, is also chairman of the special steel panel. Much of the reasoning in his report might be applied to the current steel wage dispute, industry fears. Wright management had relied on some similar arguments being used by steelmakers before the WSB hearings in New York.

In both cases, industry spokesmen have warned Prof. Shulman and his associates that wage increases without corresponding price rises could bankrupt the industry. Union members have ridiculed this stand.

Union Shop Trend Gathers Steam

Although 17 states have legislated against union-security agreements, the union shop movement in labor negotiations is gaining important weight. This is at the expense of labor-management contracts providing other types of security — such as "maintenance of membership" or "sole bargaining rights" assurances, reports the Bureau of Labor Statistics.

Spread of union shops varies geographically. About 70 pct of contracts in the Middle Atlantic states carry union shop clauses. But in the South only 18 pct provide for the closed shop.

Steelworkers' Wages At New High

Steelworkers' average hourly wage set a new record in December at $1.987. Annual average for 1951 of $1.945 was also a new high, according to American Iron & Steel Institute.

Total payroll for the steel industry rose nearly 21 pct in 1951 to the record high of over $2.8 billion. The industry employed more people than ever before, with an estimated average for the year of 670,700.

Industry wage earners worked an average of 39 hr per week in December. Average for 1951 was 40.2 hr per week, above 1950's average of 39.0.

Local WSB to Handle Auto Wages

Final decisions on all wage adjustment petitions involving some 11 auto and auto parts companies will be made by the Detroit Regional Wage Stabilization Board.

This authority has been delegated to the Detroit unit by the national Wage Stabilization Board, as an amendment to WSB Resolution 64.

In the same amendment, WSB ruled that all tool and die industry cases will continue to be processed by the appropriate regional board.

X-RAY GAGE: An instantaneous and continuous record of the tin coating on tinplate is possible with this X-ray gage installed on an electrolytic line at the Aliquippa plant of Jones & Laughlin Steel Corp. Metal box on lathe carriage contains X-ray tube and scintillation counter. Recorder shows tin coating thickness and indicator hand points to position gage occupies in relation to tin strip.

STRUCTURALS: You'll Get Them Sooner

Inquiries down 60 to 70 pct in year . . . Structural demand drop unrealistic because of controls . . . Contractors shaving profits to keep men, equipment busy—*By R. L. Hatschek.*

Contractors must hunt harder to get new jobs today. Volume of new structural inquiries has fallen sharply in recent months and, while builders are busy at the moment, there isn't much work in sight for the period 6 or 8 months from now. Actual level of new inquiries is about 60 to 70 pct lower than a year ago, say structural steel suppliers.

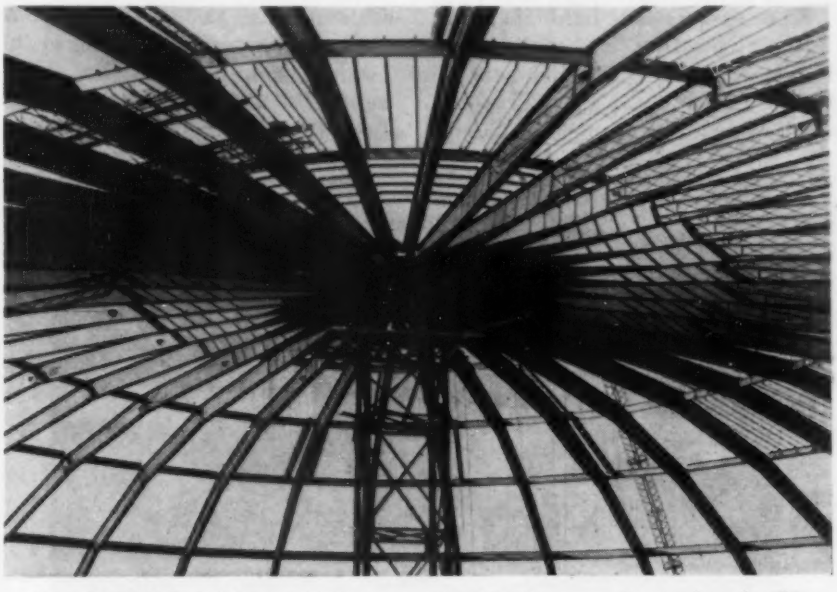
Pressure for more structural steel is waning, although still high, as mills have shifted product mix more heavily toward these items. Another contributing factor is that building of new industrial facilities has passed the 40 pct mark and these earlier phases are the ones using structurals. This year is expected to see two-thirds of the new plants finished.

Delivery of structurals is much faster than it was a year ago. If you have the official Washington nod on your new plant, you can get the steel in 6 to 9 months. Early in 1951 it would have taken twice as long.

Picture Unreal—Government defense and production agencies have had much to do with the lessening of demand by limiting permitted construction. Many feel that it is impossible to appraise real demand because of this artificial control. It's a sort of double boiler with the top simmering and the bottom bubbling furiously away.

Examples of the underlying pressure are highway projects and new school construction. Enrollment of new pupils in elementary and secondary schools, public and private, has been increasing steadily and will hit a peak in 1952 with a net increase of about 1.7 million new students.

Highway departments across the nation have been allocated about a quarter of their stated structural steel requirements—and they want the rest. One gimmick to get it is being tried by the Pennsylvania State Dept. of Highways. The trick there is to build roads right up to bridge and overpass abutments, figuring that John Q. Motorist will be sufficiently aroused by the detours to write his Congressman about getting the needed steel.



NOT ENOUGH: Builders would like to see inquiries for more structural work. This is the dome for the new Jordan Marsh department store near Boston.

Shaving Bids—But the lid is still tight and new construction projects are just not showing up. The result is that contractors are forced to study costs more carefully and shave their bids a little closer in the hope of getting jobs—but someone else always seems to bid a little lower.

One contractor states that he is bidding some jobs at his estimated cost in order to keep equipment from becoming idle and maintain his work force at full strength. Another large builder, who ordinarily tackles only the big jobs, was recently awarded the contract for a small suburban school building.

One recent sewer project in Philadelphia drew no less than 19 bids despite its low value of under $100,000, a boon to the city but a strong indication of the dearth of new inquiries and the growing desperation of contractors to get them.

Washington Helps — National Production Authority recognizes the difficulties contractors must face and has ruled that more structural steel will be allocated for construction of non-defense projects in large cities later this year. NPA administrator Henry H. Fowler indicated the government's position on "non-essential" construction last week after widespread unemployment in New York City building trades had been called to his attention.

In the near future, Fowler says, NPA will announce that certain specific and specially defined classes of non-industrial construction which have a relatively high degree of essentiality or public

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TOOLMAKING: Shops Multiply in West

Heavy war industry orders encourage growth of West Coast tool and die shops . . . Association meets in Los Angeles . . . Labor shortage handicap . . . Hint at migration from Detroit.

War plants' heavy tooling orders for jet aircraft, guided missiles, and electronic equipment has resulted in West Coast tool and die shop expansion at a rate unmatched by even large centers of Detroit, Chicago, Cleveland, and Dayton, said George S. Eaton, executive secretary of the National Tool & Die Manufacturers Assn.

The association held its first national meeting in Los Angeles recently to honor establishment of the local chapter in 1951. Trustees went on record as having the unanimous opinion that Los Angeles is now the fastest expanding area for making of tools and dies needed to mass produce war items.

The Big Try—Mr. Eaton said the contract tool and die industry in all areas must exert maximum efforts to meet pressing demands of military and essential civilian demands. The most productive machine tools available should be used to compensate for the shortage of skilled men.

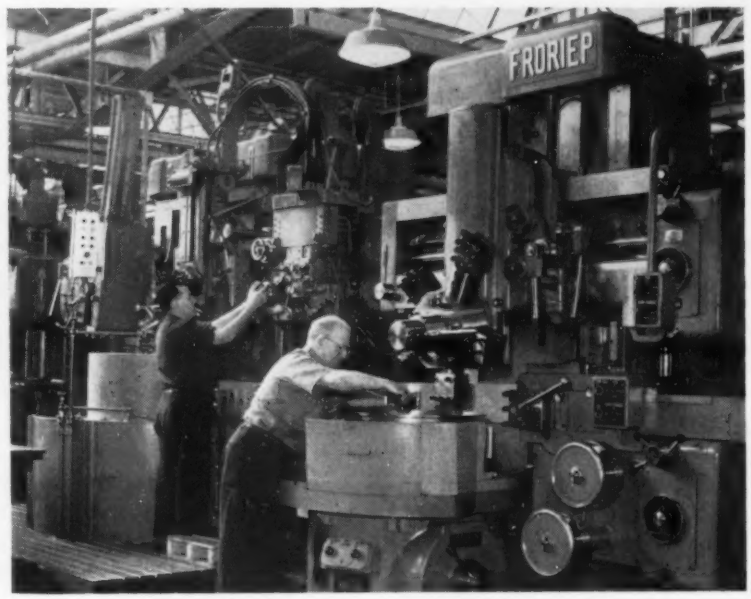
Still the most glaring handicap to the industy is the scarcity of toolmakers. The meeting discussed ways and means to alleviate this problem but NTDMA estimated that the country needs a minimum of 15,000 to 20,000 more toolmakers. Considering that a toolmaker's training is almost the equivalent of a college course in duration before he can reach top status, swelling the working force within the emergency period will be most difficult.

Sudden growth of tool and die work on the West Coast is bound to pose handicaps in getting skilled help. But Ralph L. Chrissie, of Hollywood Mfg. & Supply Co., told of a growing migration to the West Coast of tool and die workers thrown out of work by auto production cutbacks.

No High Priority — Tool men complained that they were being called upon to produce prodigiously but that Washington had not gone to bat for them in granting high priorities for procurement of vital machine tools. Without these, toolmakers cannot expand further to meet radical changes in tooling being currently imposed by jet aircraft and guided missiles. Heavier, stronger construction and keeping stricter accuracy complicate military demands.

Filling in details of the West Coast growth picture, Carl T. Weitzel, president of Southern California Tool & Die Assn., said, "It is fantastic how shops have sprung up in recent months. There are now more than 300 of them in this area. New plants and facilities are being added as rapidly as men and machines can be found."

James Riddle, vice-president of Modern Tooling Co., pointed out that 1951 saw a doubling of sales on the West Coast. Delivery time stretched out. Mr. Riddle noted that his plant is working 58 hr a week on one shift. Other plants are adding second shifts when they can find enough skilled men. A goodly percentage of tooling work is being done by West Coast shops for plants in the Middle West and in the East.



Aircraft Maker Puts Foreign Tools to Use

Already in use at United Aircraft Corp.'s Pratt & Whitney Div. are the first of some 74 new European machine tools. The foreign purchases, over $1.7 million worth, were made because European toolbuilders could guarantee earlier delivery than American manufacturers.

Machine tools being built abroad are for the most part large and complex, such as radial drills, milling machines, facing lathes, and vertical boring machines. In every case, P&W obtained special exemption from the "Buy American" clause in its contracts because of the earlier delivery dates.

Shown above is a Froriep 39-in. vertical turret lathe, now in use. This is the first of 30 to arrive from Froriep G.M.B.H., Rheydt, West Germany. Three other machines have also arrived, one from Germany and two from Switzerland.

COAL: Steelmakers Buy Reserves

Expanded steel ingot capacity brings greater use of coke ... Pitt-Consol and 3 steel firms form new company ... Known metallurgical coal reserves start to run low—*By J. B. Delaney.*

Steel producers are sewing up more of the known coking coal reserves in western Pennsylvania. Chief reasons are expanded steel capacity, and a desire to make certain that this metallurgical coal will be used for coke.

Known reserves of top quality metallurgical coal are showing signs of petering out. It is hard, though, to obtain a responsible estimate on how long these reserves will last. Mills are stretching the supply by blending with lower quality coals. Washing plants also make possible use of coals that in years past would not have been considered.

Three recent transactions between Pittsburgh Consolidation Coal Co. and steel producers tied up in whole or in part the output of several mines in this area.

New Company—Last December Pitt-Consol announced that National Steel Corp., Steel Co. of Canada Ltd., and Youngstown Sheet & Tube Co. had joined with it in forming the Mathies Coal Co. This company, owned 30 pct by Pitt-Consol and 70 pct by the steel companies, will operate the Mathies Mine with its 30 million tons of Pittsburgh Seam metallurgical coal. Production will be increased over the next few years to accommodate present customers of Pitt-Consol as well as the needs of the steel producers.

Last week it was announced that Pitt-Consol was leasing Renton Number 6 Mine in the Freeport Field, northeast of Pittsburgh, to Republic Steel Corp. Approximately 3000 acres of metallurgical coal are involved. Republic will coordinate raw coal facilities at the mine with its own rebuilt coal preparation plant at Russelton.

Also, Pitt-Consol and National Steel Corp. have combined acreages in the Freeport field and jointly leased approximately 6000 acres to a newly formed corporation, Renton Coal Co., owned 60 pct by Pitt-Consol and 40 pct by National Steel. Renton Coal Co. has acquired Renton No. 3 Mine from Pitt-Consol.

Good Deal—These arrangements are advantageous to the steel producers on several counts. Most important are acquisition of coal reserves in already-developed mines and, except the Republic deal which is an outright leasing, a management skilled in mine operation.

Were the steel companies to develop new mines of their own, the capital outlay would be enormous. At present-day costs development of a mechanized mine and installation of coal cleaning equipment would involve an outlay of $8 to $10 per ton of annual capacity. In the 1920's, the cost was $1 to $2 per ton.

INSURED: Steelmakers are insuring their supplies of coking coal by buying reserves. Here miners drill holes in the face before placing explosives to loosen the coal.

Saving Copper:

GE substitutions, design changes save 10 million lb of copper.

General Electric Co.'s 1951 copper conservation drive based on use of copper-substitute metals and design changes have released about 10 million lb of scarce copper to the firm's defense output.

Harry A. Winne, GE vice-president of engineering, reported last week from the GE plant in Schenectady, N. Y., that aluminum and other metals had played a big part in substituting for copper.

GE's decision to lean more heavily on aluminum was based on forecasts of National Production Authority that aluminum would be more plentiful than copper in the near future. Copper producers have railed against NPA's attitude, claiming that shortage of their metal may ease.

Mr. Winne said, "There are thousands of cases where we are substituting aluminum and other metals for copper." Scheduled design and manufacturing changes will save more than 13 million lb of copper annually.

At GE's Pittsfield transformer plant, engineers worked out new designs for transformer parts and substituted aluminum for copper in bushing cores, forgings, capacitator cases, and other parts. Further studies indicate even greater substitution savings of copper.

Now, a major part of the standard GE washing machine motor model is being produced with aluminum windings—instead of copper. Plans for this switch are being made for other motors.

GE's turbine plant is basing hopes for large copper conservation through development of a new aluminum alloy, "Cond-Al," which GE claims can be used efficiently in turbine generator field windings.

Nicaro Furnaces Beat Schedule

Late last week Senator Lyndon B. Johnson, D., Tex., chairman of the Senate Preparedness Committee, disclosed that four furnaces at the Nicaro nickel plant have been reactivated 60 days ahead of schedule. They went into operation Jan. 31, and turned out 5 tons of nickel in one day, the Senator said.

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BRITAIN: Needs Materials, Men

Production capacity has outstripped availability of vital raw materials . . . Coal, steel and electric power are needed most . . . Manpower also critically short—*By H. Hutchinson.*

Britain's manufacturing production in the past few years has outstripped the nation's capacity to expand its output of coal, steel, and power. Rearmament has caused other shortages, notably of sulfur and metals.

Total United Kingdom exports —on which Britain's entire economy rests, including her ability to rearm—continued to increase in 1951. In addition, the greater part of the first year of the rearmament program was completed. But shortages held back expansion of production capacity.

In 1950 the 9 pct expansion rate was among the highest in the world. For the first 9 months of 1951 the rate stayed at about 4 pct. The drop was anticipated, since many factories are re-tooling for defense.

Higher Output—This expansion is the result of higher productivity rather than increased manpower. Britain has had no large pool of unemployed since 1940. More women have been drawn into industry, but, on the whole, increased production reflects improved methods and more output per man-year.

Industry must have greatly increased quantities of raw materials, especially steel, if it is to resume the 1950 rate of advance.

Mr. Hutchinson, economist and industrial writer, is with the British Broadcasting Co.

All available resources and imports are being worked to the limit to support a production unequalled in Britain's industrial history.

Output today is about 50 pct greater than before World War II. Two million more people are working than in 1938. In spite of the general adoption of the 40-hr week, the actual number of hours worked each week is around 46—almost exactly the same as before the war.

Most Vital—Biggest growth has been in industrial equipment, shipbuilding, and vehicle building. These industries today employ 4 million workers, compared with 2.75 million before the war. Britain's export and defense programs depend on these.

And it is these areas which are consuming coal, power, steel, and other raw materials faster than they can be supplied. Industrial consumption of coal, for example, is rising nearly 8 million tons each year. Coal production is expanding only about 5 million tons a year. Steel production is almost double prewar levels, but industry still can't maintain full production because of shortages.

Streamlining of Britain's coal industry for more output has been going on for 4 years, but more time is needed. U. K. coal is hard to get, lying in mines three to four times deeper than those in the U. S., and in narrower seams. Real mechanization under those circumstances is a long-term, expensive job.

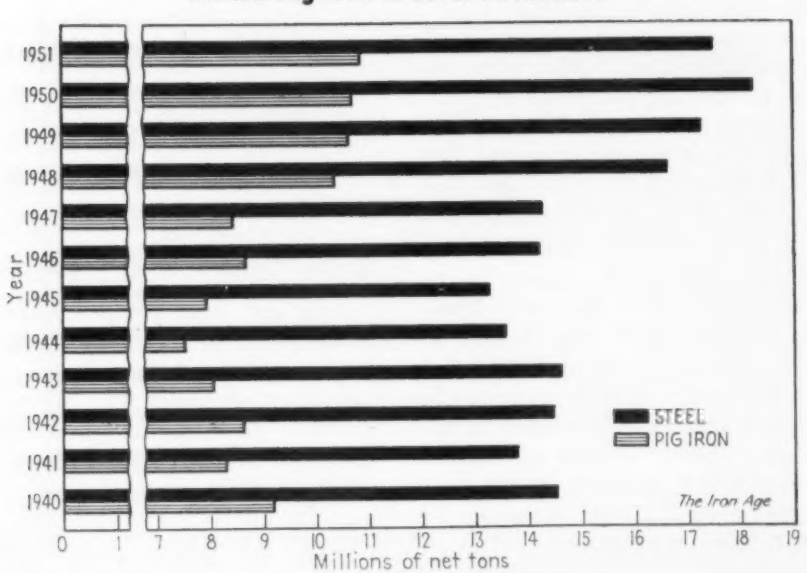
More Men—Total answer to higher production is alleviation of shortages and more manpower. But Britain's manpower supply is fully stretched already. There are at present 400,00 jobs that can't be filled. Unemployment is little over 1 pct of the working population, including women, girls, and boys, and most is transitional.

Increased steel production depends on more high-grade overseas ore and more scrap. They're simply not available.

Steel shortages have been felt mainly in consumer goods, and no industry has been short of coal, although exports have been cut. So far this winter the power stations have met the peak load demands. Industry has cooperated by staggering working hours to spread the load. Normal peak daytime industrial current demand has been reduced an average of 20 pct.

Britain has kept her key industries going so far by cutting coal exports, staggering power loads, and steel allocations. The less essential manufacturers have borne the main burden of the shortages.

British Pig Iron & Steel Production



TRACTORS, left, use slings to move heavy pipe sections into place near the river's edge.

HEADER VALVES, right, where 30-in. line branches into three 20-in. lines that spanned the river.

Pipeline Spans Mississippi to Bring Gas to Chicago

Project: Easing across 3000 ft of Mississippi River bed three 20-in. pipelines. This was one of the final stretches of a 1340-mile pipeline to give Chicago area consumers cheaper natural gas from the fields of the Texas Gulf Coast. Scene: On both banks of the river 270 men labored to pitch the long span of corrosion-protected pipe from Grand Tower, Ill., to Wittenberg, Mo. The river was swollen and treacherous and winter forced ice along the river currents.

Midwestern Constructors, which erected a 400-mile stretch of the "big inch" line, had to get the "big boy" across the river by Dec. 1. Two other satellite pipelines would follow. If the schedule wasn't met, winter would load more ice into the river, multiplying hazards.

The muddy river bottom was churned up to clear a channel in which the pipe would rest securely. A cutter-head dredge and sand-sucker dredge dug out a path 20 to 40 ft deep and 20 ft wide. The first pipe was heaved into the river. But a barge pitching in the current struck and broke off the sealed end. The pipeline had made it two-thirds of the way across.

Midwestern had to try again—fast. It hauled the broken pipe a few feet up the river and started a second time. The 40-ft lengths of pipe went through a machine that primed the surface and coated the pipe with protective materials.

Long sections of pipe were assembled on the bank. Midwestern men wanted the pipe to keep moving. They did not want to edge in a short length and wait for welders to prepare the next. Welds on the 20-in. laminated pipe were X-rayed and tested on the spot.

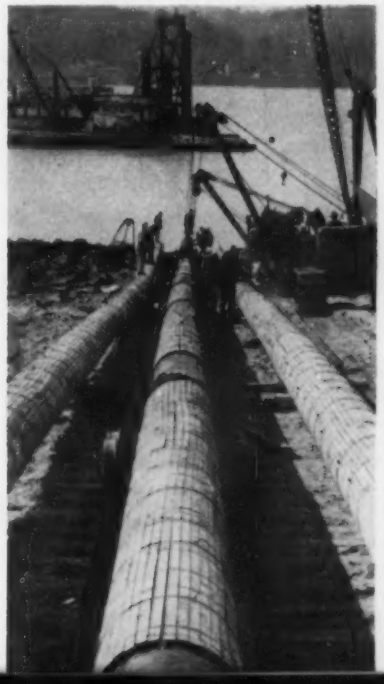
Then the pipe, plugged at its nose, started to move down a section of railroad track on tiny cars. The first section was 1500 ft long.

The dredging boat *G. A. McWilliams* was stationed in midstream. Its spuds were sunk solidly in the river bed. Jones & Laughlin wire cable was unreeled from the stern anchor winch and fastened to the leading plug of the pipe on shore. Pontoon barges floated in the river to keep the pipe from settling when the boat's cable hauled the pipe across the water.

The order came to "heave 'round"—and the pipe was stretched out halfway across the river. With the first pull completed successfully, welders' torches began to spark and another section was welded to the first. On the third pull the pipe had reached the opposite bank.

WORKMEN seal over pipe-end before joining with another section.

COVERED with wood lath, sections of 20-in. pipe await 3000-ft pull across river.



PIPE is lowered in on Wittenberg side of Mississippi River . . . crossing successful.

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STEEL: Where Are OPS Price Rises?

Capehart price rises for steel still bogged down at OPS . . . "Slow but steady" progress reported . . . OPS will appoint industry subgroups to help . . . Industry criticizes breakdown.

Problem of setting a proper base for determining Capehart price-adjustment procedures is still bogged down at the Office of Price Stabilization.

Government and industry officials report "slow, but steady" progress in the drafting of the procedural order for pricing general steel products under the Capehart Amendment.

At the second of two meetings between industry committeemen and government officials, OPS said it would appoint industry subgroups to help draft the order.

Ask More Groups — Basically, the proposed regulation gives producers the choice of applying for price adjustments for all product lines in either or both of two categories. One classification contains all iron and steel items other than alloy, and the second applies to alloy steel products.

Some industry representatives suggested this breakdown is not sufficiently detailed. They recommended separate categories for other product groups, such as stainless steel.

Confidential—Industry committeemen, pointing out the confidential nature of cost figures for individual items made, urged that firms be allowed to show only cost changes, rather than actual figures, on their applications for price adjustments.

The complications already apparent in writing the order make it unlikely that all the wrinkles can be ironed out before the Feb. 24 strike deadline. Meanwhile, Administration officials give no hint that they will permit price increases outside the Capehart Amendment as part of the wage-price settlement.

Situation Fluid—The very fluidity of the price order draft leads some sources to believe that sufficient rubber will be worked into the formula to make it a basis for final settlement.

Economic Stabilizer Roger Putnam is still looking for a better yardstick for industry earnings standards. He has admitted to uneasiness about the fairness of standards included in the Johnston formula. This could also figure in the revision of steel prices.

FIRE CONTROL: Fires in metals are smothered by a new extinguisher powder, MET-L-X, developed by Ansul Chemical Co. The non-toxic, non-corrosive powder smothers a blaze here by forming an air-excluding crust over flaming magnesium.

Refractories Get New Price Reg.

Dollars-and-cents ceiling prices now cover a wide range of refractory products, as a result of a new Office of Price Stabilization order.

Designated as Ceiling Price Reg. 125, the order became effective Feb. 12. It gives specific coverage to many items formerly priced under either the General Ceiling Price Reg. or CPR 22.

CPR 125 is applicable to fire clay brick; silica brick; insulating firebrick; ladle brick; hot top brick; sleeves, nozzles, and runners; high alumina, basic, and special refractory brick; and such specialties as mortars, plastic refractories, and castables.

Export sales are not covered, nor does CPR 125 apply to graphite crucibles and accessory or related products in which natural graphite is 15 pct or more of total weight.

Detroit Gets Aluminum Bonus

Defense Production Administration will release an additional 1 million lb of aluminum to auto producers for second quarter consumption.

Officials hoped it would help boost passenger car output during the quarter substantially above the estimated 800,000 permitted by initial allocations of controlled materials. Reports from Detroit indicated the supplemental aluminum will not help much without additional copper also.

The aluminum was about half as much as the amount said to be needed to boost car production to the 930,000 unit level permitted by the steel allocation.

Industry Controls This Week

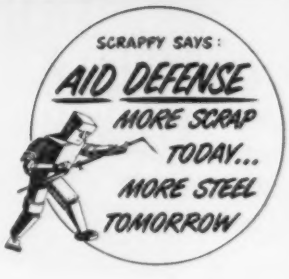
Lighting Fixtures—M-97 limits use of copper in lighting fixtures where substitution is possible.

Refractories—CPR 125 sets dollar-and-cents prices for a wide range of refractory products.

Turn Page

Feeling low about the steel situation?

Let us try to help you! Very frequently our experience will suggest a way out of your particular steel supply difficulty. We may have substitute materials or know of ways to stretch the supply of steel available to you. Call us *first* when you have a steel problem.



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UNITED STATES STEEL

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THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years

PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated LUBRICATION IS NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

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NO MAINTENANCE PROBLEMS.

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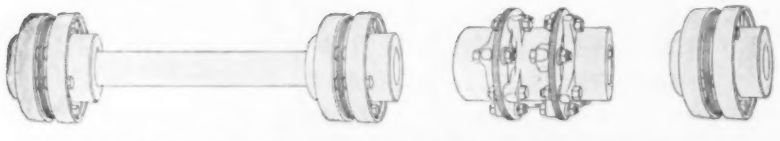
ALL PARTS ARE SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Construction Restrictions Stick

There will be no relaxation of controls over commercial construction until the supply of structurals is adequate, according to top Defense Production Administration officials.

Requirements are now running about 170 pct of supply on an overall basis.

A little more leniency might be shown toward such structures as firehouses and the like. These, thanks to the devious ways of government, have been included in the "commercial" classification for purposes of materials allocation and control.

Warehouses — There may be more generous treatment of warehouse and storage construction a little later. A survey is underway to find out if space is available to take care of the increasing amounts of goods pouring from defense plants.

In the meantime, National Production Authority reports that more than 77 pct of applications for non-military construction was turned down for first quarter 1952.

New Machine Stocks Order

National Production Authority is putting together an order which will give a clearer picture of inventories of used and imported metalworking equipment, as well as provide standby controls.

When and if issued, the order will require complete inventory reports from dealers, brokers, and rebuilders with respect to about 38 types of used and imported metalworking equipment.

It will also provide that NPA may, at any time felt necessary, order dealers or rebuilders to withhold from sale specific used or imported tools for a 7-day period to allow preferred potential buyers to inspect them.

At the same time, NPA is also considering the need for an order, recommended by the industry's advisory committee, which would set up a priority formula for obtaining repair parts and components.

Decontrol for Some Industries?

Analysis of decontrol measures as they might affect some industry fields is being started by a new Office of Price Stabilization committee, as direction of the agency passes from Michael V. DiSalle to Ellis Arnall.

In his last week in what he called a "very grim job" as price stabilizer, DiSalle warned that appointment of the 7-man committee does not imply immediate major decontrol action. The group, he

PRICE BOSS: Ellis Arnall, ex-governor of Georgia, last week took over the Office of Price Stabilization from Michael V. DiSalle.

forecast, will give OPS a "sound and more complete basis" for recommendations on decontrol policy.

Report to Arnall — Headed by Edward F. Phelps, Jr., the agency's assistant director for price operations, the committee will report its findings to Mr. Arnall. He, in turn, will give completed studies to Economic Stabilizer Roger L. Putnam. The latter will correlate OPS recommendations to policies of the Wage Stabilization Board, also within his jurisdiction.

First job of the decontrol group is expected to be an inquiry into textile pricing problems. In time, the committee may make similar studies of all major production fields.

As yet there is no indication of the degree of importance Arnall will ascribe to decontrol measures.

BUTLER
MANUFACTURING COMPANY
chose Birmingham* to serve the *Growing Southeast*

***One of Butler's 5 Large Plants**

Butler Manufacturing Company is one of the largest manufacturers of fabricated metal products. After a long study to determine the most desirable location for a plant to serve the Southeast, Butler selected Birmingham. It established recently a large plant on a 40-acre site in Birmingham's western section. This plant is now making prefabricated steel buildings, welded steel tanks and a wide variety of custom-built equipment fabricated from structural steel and steel plates.

"Our mounting sales in the Southeast made it imperative for us to have a plant to serve this growing market," said Oscar D. Nelson, president of Butler Manufacturing Company. "Our study convinced us that no city in the Southeast equals Birmingham's advantages to us for the manufacture and the distribution of our products in that section. Birmingham offered us doorstep steel supply and all accessory items that we needed, such as fittings, valves, welding rods and lumber, produced largely by local or regional enterprises. Birmingham also has a plentiful reserve of skilled labor and adequate power, water and gas. We are more than pleased with the progress of our Birmingham plant and confidently expect its growth to keep pace with the remarkable development of this great district."

* * * * *

Butler is one of many recently established industries that have found the Birmingham district an unexcelled location from which to serve the Southeast. The Committee of 100 or any of the undersigned members of the Executive Committee invite your confidential inquiries for specific data regarding Birmingham's advantages for your plant, office or warehouse.

BIRMINGHAM
COMMITTEE OF 100
1914 Sixth Ave., N., Birmingham, Ala.
Executive Committee

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Specialists in Industrial Cleaning Products

Wyandotte's new Research Building in progress

How Wyandotte's expansion program will help solve your cleaning problems

UP AND DOWN the line, we're doing everything we can to keep pace with the increasing needs and the new problems of industry.

New research facilities

Now under construction, for instance, is this new Wyandotte Research Building. When completed, it will contain the finest facilities for research into cleaning techniques and product application in the industry.

It will house complete metal-cleaning laboratories, a plant-size power washer, a complete set of plant cleaning and plating tanks, barrel-finishing equipment, corrosion-test facilities, a water-wash paint-spray booth . . . everything needed for developing, testing, and perfecting metal-cleaning and related products.

Production and service

Expanded production facilities, too, will help assure you of continuing dependable supply; and our newly augmented Technical Service Department will be able to give you, even more than before, the best technical help available.

All types of industrial cleaning, as well as barrel finishing, acid treatments, and paint stripping, are our specialties. Let our representative help you. *Wyandotte Chemicals Corporation, Wyandotte, Michigan; also Los Angeles, California.*

CLEANING THE WORLD

Largest manufacturers of specialized cleaning products for business and industry

Wyandotte CHEMICALS

Helpful service representatives in 88 cities in the U.S. and Canada

—Controls—

Oil & Gas Lines Get Steel Quotas

Priorities and second-quarter allocations for more than 588,000 tons of steel have been approved for natural gas and petroleum expansion projects.

This includes 218,684 tons of line—pipe for 16 large crude oil lines, 29,620 tons for five oil products lines, and 174,520 tons of large diameter pipe for five major natural gas lines.

These allocations will allow completion during the second quarter of 11 of the oil lines and two gas lines. Six oil lines and the remaining three gas lines are scheduled for completion during the third quarter and the remainder before the end of the year.

Tinplate Quotas for Export Set

An export-license quota of 120,000 short tons of specification production tinplate, primes and seconds, has been set for the second quarter by the Office of International Trade.

This is an increase of 5000 tons. Of the second quarter figure, 105,500 tons must be for food packing and the remainder for petroleum. Shipments can only be made on orders meeting definite specifications.

A first quarter export quota of 75,000 tons of secondary tinplate for food and petroleum packaging and other approved end uses has been set by the Office of International Trade.

This is more than double the fourth quarter quota of 33,335 tons.

Exports to Japan Need Approval

After Feb. 15, controlled materials and CMP "A" products will be licensed for export to Japan and the Ryukyu islands only if approved for export by the occupation authorities or, in the case of Japan, by a local agency authorized by occupation authorities.

One type of certification is required if the material for export is for civilian use and another must be used for export for military use.

Defense Contracts

New Termination Rules Delayed

New Defense Dept. rules on contract termination probably cannot come into full use until late spring, according to officials in that agency.

The rules, issued as Section 8, Armed Services Procurement Regs., are designed to establish uniform termination procedures for all Defense Dept. agencies. Original effective date was Mar. 1, but distribution will probably be too slow for general effectiveness by then.

Procurement begun after Feb. 1 can be covered by the new regulations. Existing contracts can also be covered by amendments to Sec. 8 if desired.

New Light Metal Foundry Opened

Magnesium and aluminum casting capacity was expanded by 60,000 lb monthly when Castalloy Co. opened its new foundry at Natick, Mass., recently.

New facilities include complete equipment for casting, finishing, heat treating, testing and X-ray. Castalloy will specialize in magnesium castings for airframes, jet engines and electrical and radar components.

DETECTS FLAWS: This betatron will soon be in use detecting flaws in castings at the Coraopolis, Pa., plant of Continental Foundry & Machine Co. The 22-million volt betatron will inspect ferrous castings up to 24 in. thick. It is many times faster than industrial X-ray equipment. Allis-Chalmers is the builder.

KENNAMETAL *Carbide* TOOLING

For the EXTREMES...

PRECISION BORING

...and EVERYTHING in Between...

HEAVY DUTY TURNING OR PLANING

GREATER PRODUCTIVITY!

No matter what type of job you have . . . precision boring, high production, heavy cutting . . . sturdy, long-wearing Kennametal tools will enable your machines and your men to do more, in less time, at less cost. We have hundreds of performance reports to prove it—describing a wide variety of jobs on different types of materials. On many of these jobs Kennametal tooling pays for itself in savings effected in grinding, alone—not counting reduced tooling costs, and higher productivity attained. Let us demonstrate.

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KENNAMETAL® Inc.
Latrobe, Pa.

MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES AND CUTTING TOOLS THAT INCREASE PRODUCTIVITY

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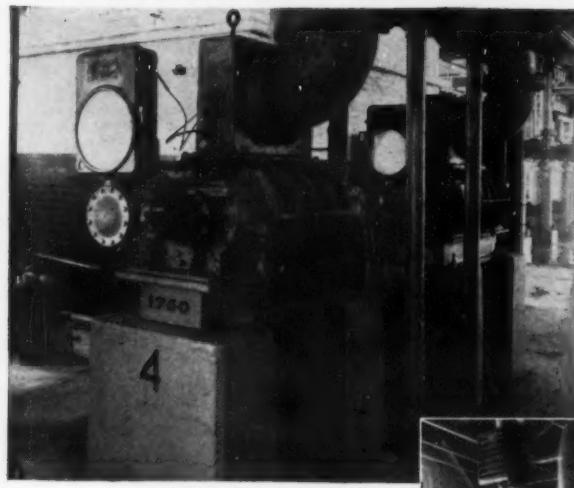
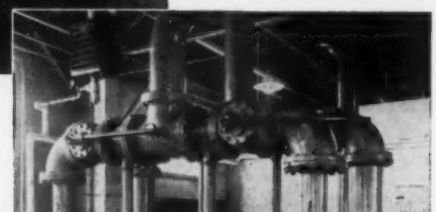


The four meters illustrated are part of a total installation of nine R-C Meters in a large processing plant. These units measure acetylene gas sold to nearby manufacturers, who also use R-C Meters at the receiving ends. Capacities range from 3,000 cfh to 130,000 cfh.



YOU CAN ALWAYS

trust

R-C METERS

If you're measuring gas for production processes, you can't take any chances on quantities. If you are buying or selling it, you need cash register accuracy. You want equal precision for departmental cost accounting.

The permanent accuracy of R-C Positive Displacement Meters has long been proved for all these purposes by manufacturers and utilities which buy, sell and use gas. Four important reasons account for this unvarying reliability:

1. **Accuracy is not affected by variations in specific gravity, rate of flow, pulsation, moisture, impurities or uncontrollable factors.**
2. **Accuracy is not subject to adjustment of meter or recorder by operators or other persons.**
3. **Accuracy is not affected by reasonable overloads.**
4. **Accuracy is permanent because measuring chambers are surrounded by precision-machined, cast-iron surfaces.**

The 31 standard sizes of R-C Meters give capacities from 4,000 cfh to 1,000,000 cfh. They are extremely compact, permitting installation in cramped spaces. Indicating and recording instruments are available for all types. For whatever purposes you measure gas, you can permanently depend on R-C Meters. Ask for Bulletin 40-B-14 or write us your specific problem.

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510 Ohio Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE

BLOWER BUILDERS SINCE 1854

ONE OF THE DRESSER INDUSTRIES

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation, No. or proposal, and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Springfield Armory, Springfield, Mass.
Knob, windage rear sight assy, 446,343 ea, 52-149-B, Feb. 15.
Rod, follower assy, 555,161 ea., 52-149-B, Feb. 15.
Cap, butt plate, 37,210 ea., 52-149-B, Feb. 15.
Swivel, butt, 33,945 ea., 52-149-B, Feb. 15.
Swivel, stacking, 80,389 ea., 52-149-B, Feb. 15.
Swivel, stock ferrule, 43,737 ea., 52-149-B, Feb. 15.
Sight, front, 36,883 ea., 52-149-B, Feb. 15.

Navy Purchasing Office, Washington
Wrenches, double and screwdriver, 52,105, 5790-B, Feb. 21.
Wrench, sets, socket extension, 127,055, 5841-B, Feb. 20.
Wrenches, pipe, 28,425, 5843-B, Feb. 21.
Wrenches, adjustable open end, 189,035, 5842-B, Feb. 20.
Wrench set, socket, 75,266 sets, 5844-B, Feb. 21.
Wrenches, box, combination, 4783, 58607-B, Feb. 20.
Axes, firemans, mountain, 3146, 3287-Q, Feb. 21.
Machines, thread cutting, motor driven, 32, 3108-Q, Feb. 21.

Rock Island Arsenal, Rock Island, Ill.
Gun, filler, oil, 1255 ea., (11-070-52-658B), Feb. 29.

Ordnance Tank Automotive, Detroit Center, Detroit
Housing, tool compartment lock assy, 5600, 52-1308-B, Feb. 28.
Reinforcement, pintle hook frame, 1700, 52-1308-B, Feb. 28.
Handle, body, outside, frt, 7150, 52-1380B, Feb. 28.
Brkt, pivot, frt seat, 10,000, 52-1312B, Feb. 28.
Brkt, retaining, rear seat back frame, 16,000, 52-1312B, Feb. 28.
Socket, lt door, lower hinge, 3000, 52-1312B, Feb. 28.
Valve, hull, floor drain cock, 600, 52-1243B, Feb. 19.
Bushing, trans pinion & shaft, 3200, 52-1029B, Apr. 28.
Clutch gear crankshaft, 2000, 52-1029B, Apr. 28.

Navy Purchasing Office, New York
Terminals, lug, 30,976 ea., 324-B, Feb. 21.
Splices, conductor, 49,124 ea., 326-B, Feb. 21.
Tubing, electric metallic, 639,000 ft, 328-B, Feb. 28.

Ordnance Tank Automotive Center, Detroit
Head, trans rev gear shifter, 850, 52-1029B, Apr. 28.
Shaft, trans, 850, 52-1029B, Apr. 28.
Nut, lock, trans, 2200, 52-1029, Apr. 28.
Gear, trans rev idler assy, 340, 52-1029B, Apr. 28.
Plug, trans winch gear shifter, 1400, 52-1029B, Apr. 28.
Stud, trans oil pump body, 900, 52-1029B, Apr. 28.
Spacer, trans bevel pinion, 700, 52-1029B, Apr. 29.
Spacer, trans input shaft, 600, 52-1029B, Apr. 28.
Spacer, trans rev shaft idler gear, 450, 52-1029B, Apr. 28.

Signal Corp. Supply Agency, Philadelphia
Bolts, nuts, rivets, screws, U washers, 219, 899 ea., 12049-26-Q, Feb. 20.
Meter, self-synchronous, 225 ea.
Terminal assembly, 805 ea., 11895-14-Q, Feb. 20.
RF coils, 22,940 ea., 11841-23-Q, Feb. 18.

Quartermaster Depot, Chicago
Pans, baking & roasting, 4242 ea., 52-1017B, Mar. 3.
Pan, muffin, 259 ea., 52-1017B, Mar. 3.
Plates, pie, 141,572 ea., 52-1017-B, Mar. 3.

Ordnance Tank Automotive Center, Detroit
Clip, chassis wire, 1274, 52-1352B, Feb. 29.
Antisqueak cowl to ledge side, 6250, 52-1352B, Feb. 29.
Lever, stop control shaft, 1700, 52-1398B, Feb. 29.

Contracts Reported Last Week

Including description, quantity, dollar value, contractor and address:

Repair parts for air oxygen breathing apparatus, 181,625, $56,662, Mine Safety Appliance Co., Pittsburgh.

Repair parts for diesel engines, 2184, $34,477, Fairbanks, Morse & Co., New York.

Repair parts for centrifugal and rotary pumps, 4762, $164,849, Dravo Corp., Philadelphia.

Repair parts for pumps, 1020, $34,061, Buffalo Pumps, Inc., Buffalo, N. Y.

Water gauges, steam traps and repair parts, 59,925, $105,291, Yarnall-Waring Co., Philadelphia.

Repair parts for steam engines, 1829, $102,906, Skinner Engine Co., Erie, Pa.

Repair parts for diesel engines, 37189, $64,786, General Motors Corp., Detroit.

Repair parts for steam turbines, 3878, $30,432, The Terry Steam Turbine Company, Hartford.

Repair parts for regulators, 3775, $42,571, Robertshaw-Fulton Controls Company, Knoxville, Tenn.

Repair parts for ships telephone systems, 50,180, $80,350, Automatic Electric Sales Corp., Chicago.

Repair parts for compressors, 1967, $39,621, Hardie-Tynes Mfg. Co., Birmingham.

Pumps and repair parts, 2974, $57,582, Gardner-Denver Co., Quincy, Ill.

Repair parts for diesel engines, 85,434, $248,400, General Motors Corp., La Grange, Ill.

Piston rings, 255 sts, $91,555, Koppers Co., Inc., Baltimore.

Repair parts for turbines, 8152, $49,897, Westinghouse Electric Corp., Philadelphia.

Repair parts for compressors, 7541, $107,496, Ingersoll-Rand Co., Philadelphia.

Repair parts for regulators, 4625, $51,268, Hammel-Dahl Co., Providence.

Repair parts for electrical control equipment, 2228, $36,069, General Electric Co., Philadelphia.

Automotive repair parts, 63 line itm., $17,498, Harval Truck Equipment, Los Angeles.

Automotive repair parts, 601 line itm., $42,464, Chrysler Corp., Detroit.

Ejector assys 900,000, $30,051, Han-Dee Spring & Mfg., Hartford.

Parts for Cal. .30, $27,239, Mel-Gauge Co., East Haven, Conn.

Synchro differential transmitters, transformers and receivers, exceeds $250,000, Arma Corporation, Brooklyn.

Components of fire control system, exceeds $250,000, Arma Corp., Brooklyn.

Fire control transmitting and computing components, exceeds $250,000 $102,747, Kearfott Co., Inc., Little Falls, N. J.

Centrifugal pumps, 570 exceeds $250,000, Food Machinery and Chemical Corp., New York.

Generator sets, electric, diesel driven, 9, exceeds $250,000, Sterling Engine Co., Buffalo.

Generator set, electric, portable gasoline driven, 1585, exceeds $250,000, Kohler Co., Kohler, Wis.

Generator sets, gas, 944, exceeds $250,000, D. W. Onan & Sons, Minneapolis.

Generator set, electric, portable, 126, exceeds $250,000, The Buda Company, Harvey, Ill.

Linker, powered, 100, $223,074, Saranac Machine Co., Benton Harbor, Mich.

Range finder, T-41, exceeds $250,000, General Motors Corp., Detroit.

Replenishment of tank and combat vehicle parts, 17,600, $94,916, American Bosch Corp., Springfield, Mass.

Replenishment of hardware, 480,000, $118,848, The Armstrong Rubber Co., West Haven, Conn.

Replenishment of motor vehicle parts, exceeds $250,000, GMC Truck & Coach, Pontiac, Mich.

Replenishment of hardware, 89,200, $147,733, GMC United Motors Serv., Detroit.

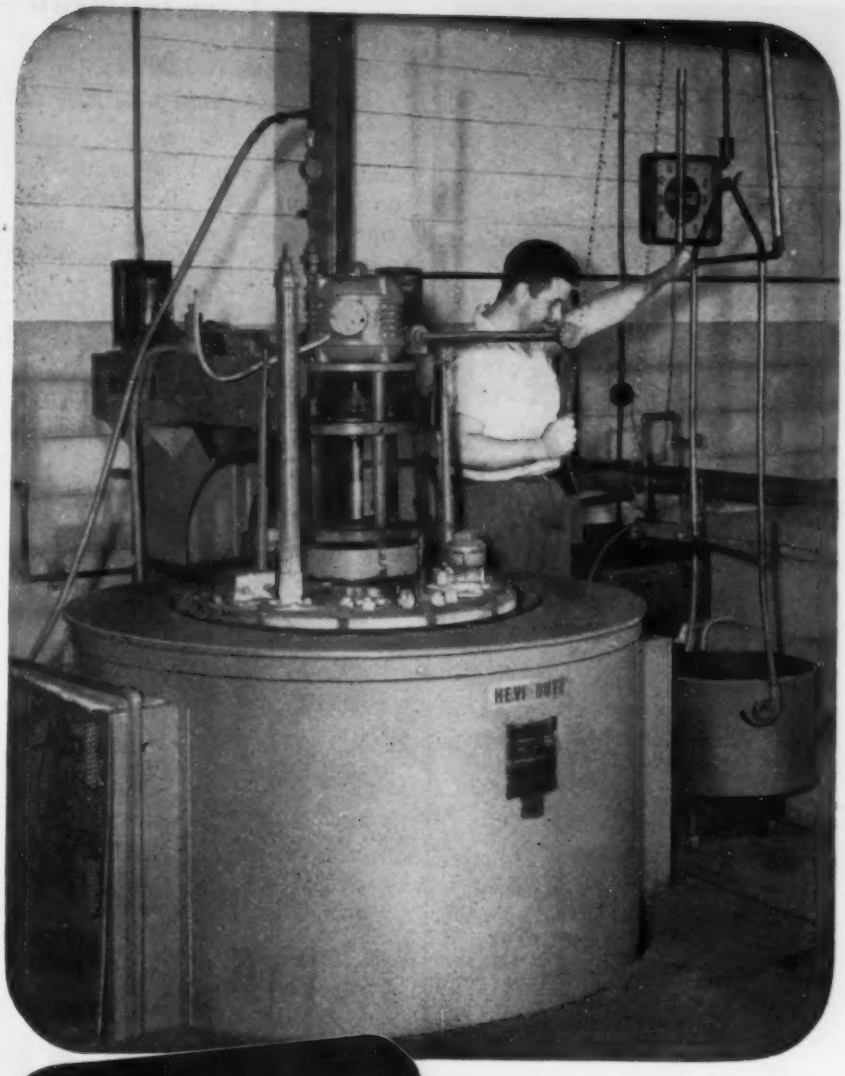
Replenishment of tank and combat vehicle parts, 796, $75,901, Houdaille Hershey Corp., Buffalo.

Replenishment of tools, 50, $87,870, Lempco Products, Inc., 5490 Dunham Rd.

Replenishment of tools, 855, $122,593, National Farm Mach. Co-op., Inc., Shelbyville, Ind.

Replenishment of hardware, 316,606,000, $26,178, Russell, Burdsall & Ward, Bolt & Nut Co., Port Chester, N. Y.

Replenishment of motor vehicle parts, 565, $27,035, U. S. Motor Truck Sales, Detroit.



"Exceptionally Versatile" . . . that's why Pesco bought HEVI DUTY FURNACES

"We use our rugged Hevi Duty furnaces for carburizing, nitriding, hardening and normalizing parts for jet engine pumps," says Russ Fike chief metallurgist of the Pesco Products Co. "We can carburize one load and nitride the next by simply changing the atmosphere. Operating costs are at a minimum due to low ammonia consumption when nitriding, and our maintenance costs are negligible."

Learn how the versatile Hevi Duty vertical retort furnace can solve your production problems, write for your copy of bulletin HD-646 today.

HEVI DUTY

HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces . . . Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

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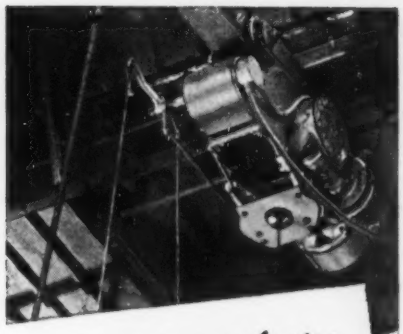
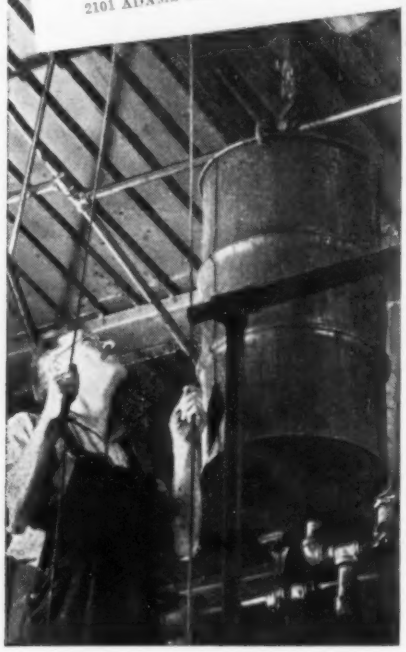


Modern Hoist Logic:

3-2 = LOWER COSTS!

—Yes, rock-bottom handling costs—*and* more output per hour! Here's the record: Heavy drums of chemicals had to be lifted to a raised vat—and lifted fast. The block and tackle formerly used required 3 men to get the proper lift speed. This ½-ton Reading Electric Hoist paid for itself in 2 months by keeping 2 men on their regular jobs and letting the third raise drums alone—in half the previous time! Let a Reading engineer help you get the same kind of handling results with a fast, smooth-working Reading Electric Hoist. Drop us a line today for full details. No obligation, of course.

READING CRANE & HOIST CORP.
2101 ADAMS STREET • READING, PA.



READING CRANES

Structural Inquiries Down

Continued from Page 85

necessity will be treated separately from general non-industrial construction. An allocation program of limited proportions will be inaugurated as soon as possible to get some of these projects under way, particularly in areas where the construction industry has few industrial expansions to keep it busy, according to the NPA head.

Steel Inquiries and Awards

Fabricated Steel Awards this week include the following:

700 **Tons,** Dover, Del., building for International Latex Corp., Hughes-Foulkrod Co., Philadelphia, general contractors, to Belmont Iron Works, Philadelphia.

300 **Tons,** New Orleans, Gentilly Boulevard underpass, for City of New Orleans, to Virginia Bridge Co., Birmingham.

107 **Tons,** Allentown, Pa., transmission towers for Pennsylvania Power & Light Co., to Bethlehem Steel Co., Bethlehem.

Fabricated Steel Inquiries this week include the following:

2600 **Tons,** Philadelphia, modification to Broad St. Station and Broad St. Suburban Station Building, bids due Feb. 18.

1000 **Tons,** New Cumberland, Pa., additional warehouse at New Cumberland General Depot, U. S. Army Corps of Engineers, bids due Mar. 5.

700 **Tons,** Marietta, Pa., warehouse at Marietta Transportation Depot, U. S. Army Corps of Engineers, bids due Feb. 26.

100 **Tons,** Pittsfield, Mass., single span steel stringer bridge with concrete deck and bituminous concrete surfacing on Wahconah St. Work includes penetrated crushed stone, base course and gravel foundation, water and sewer main installations and removal of superstructure of existing bridge. William J. Goggins, Pittsfield, district engineer. Completion date, June 10, 1953.

Reinforcing Bar Awards this week include the following:

1600 **Tons,** Rossford, Ohio, Rossford Ordnance Depot, to U. S. Steel Supply Co.

1260 **Tons,** Warwick County, Va., barracks, Ft. Eustis, to Ceco Steel Products Co.

525 **Tons,** Chicago, New York Life Insurance Co., to Turner Construction Co.

450 **Tons,** Northbrook, Ill., Harms Rd. intercepting sewer to U. S. Steel Co.

380 **Tons,** Milwaukee, shop and technical bldg., to U. S. Steel Supply Co.

345 **Tons,** Chicago, Prospect dial office to U. S. Steel Supply Co.

315 **Tons,** Chicago, Weiss Memorial Hospital to Truscon Steel Co.

Reinforcing Bar Inquiries this week include the following:

900 **Tons,** Dayton, Germantown Reservoir.

724 **Tons,** Bloomington, Ind., Life Science Bldg., Indiana University.

350 **Tons,** Portsmouth, Ohio, Detroit Steel Corp.

300 **Tons,** Cleveland, Ore Yard Extension and Furnace Foundation.

295 **Tons,** River Piers, Lucas County, Ohio, Toledo Expressway System.

MORE FLEXIBILITY IN YOUR SHOP

Harden, heat treat, temper and anneal with one furnace . . the Johnson No. 706.

Another in the Johnson line of dependable gas equipment has won its place in both large and small shops and plants. Operators like its easy adaptability. Six Johnson Direct Jet Bunsen Burners with individual shut off valves and pilot lights provide steady, easily controlled heat from 300 to 1850° F. Semi-muffled type with burners operating below Carbofrax hearth. Firebox: 7"x 13"x 16½". Also available bench style. Write for complete and factual information.

A smaller version of this highly flexible furnace is the No. 654. Four burners deliver 300 to 1800° F. Firebox: 5" x 7¾" x 13½". Available as pedestal or bench style.

JOHNSON GAS APPLIANCE CO.
598 E Avenue, N. W., • Cedar Rapids, Iowa

Johnson No. 706 Pedestal Style	$278.00
Bench Style	$250.00
Johnson No. 654 Pedestal Style	$150.00
Bench Style	$124.00

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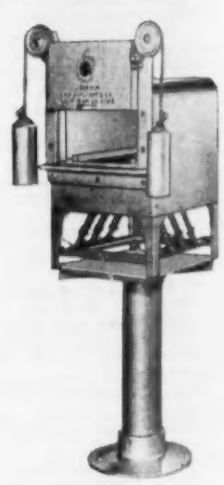

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Limited Action on Unemployment Help

Washington warns against over-optimism on effects of war contracts to ease unemployment . . . Wilson sees need for caution . . . Buyers storm against rumors of waste—*By G. H. Baker.*

Mobilization officals warn against any over-optimism that may result from the new government orders designed to relieve unemployment in the so-called "distress areas."

Under the provisions of a new "policy directive" approved by Defense Mobilizer Charles E. Wilson, and a "ruling" issued by Comptroller General Lindsay C. Warren, the government's military and civilian procurement agencies now may place defense contracts in "distress areas" even though they could contract the work at lower prices in other areas.

Automotive manufacturers and suppliers in the Detroit-Flint area, as well as textile and shoe manufacturers in New England, will benefit by the new policy soon, federal officials predict, but only to a limited degree.

Limited Action—As Wilson sees it, any relief action must necessarily be limited, and will not put all the unemployed back to work.

Great caution must be exercised, particularly with regard to the New England situation, in order to avoid a shifting of the unemployment problem from one section of the country to another.

In theory, at least, the new policy will be simple to administer: Contract officers can now negotiate with bidders in the lower bracket after the bids are opened—in order to spread the business around—instead of automatically giving the whole procurement to the lowest bidder.

Help Small Firms—Telford Taylor, head of Small Defense Plants Administration, says he is "convinced" that this "will frequently result" in increasing the participation of small firms in procurement "without any additional cost to the government."

Smaller firms, Taylor predicts, will match the low bid, is given the opportunity.

But in Congress, a number of delegations from Southern and Mid-Western states are demanding assurance from Wilson that his policy will not create new unemployment problems. Southern textile operators are fearful that their new and rapidly-growing industry may be damaged by diversion of contracts to the New England centers.

How System Works—Here's how the new policy is scheduled to operate: Labor Dept. will determine which areas have labor surpluses, and will certify them to a new Surplus Manpower Committee, which will include representatives of the Labor and Defense Depts., General Services Administration, Defense Production Administration, National Production Authority, Atomic Energy Commission, and Small Defense Plants Administration.

New contracts then will be awarded with regard to the committee reports.

Noisy Retort—Military procurement officers, irked by what they feel is unjustified criticism of their buying policies, are now taking their stage directions from Sen. O'Mahoney, D., Wyo., of the Senate Appropriations Committee.

O'Mahoney's cue to the Pentagon spenders: "Do a little table-thumping and raising of the voice."

So, amid raised voices and thumped tables, the armed forces buyers now hotly maintain that their fine records of economical procurement are being over-shadowed by "rumors of waste."

"Oyster Forks Fox"—Vice Admiral Charles W. Fox, Navy materiel chief, denies reports that the armed forces have wasted $5 billion to $8 billion through failure to agree upon a standard catalog of military supplies.

NEW SIGHT: Air Force Secretary Thomas Finletter, left, and Defense Secretary Robert Lovett, right, show the new $250,000 K-1 bomb sight at right. Its World War II counterpart, the Norden, in foreground, cost only $8,000.

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SDPA: More Help for Little Fellow

New orders give agency more power to aid smaller defense plants . . . Production pools authorized . . . Old OSB personnel and property transferred . . . "Lowest bidder" policy waived.

Machinery of federal assistance to smaller firms in securing defense orders now has been shifted into high gear.

A 4-point White House order issued last week to Small Defense Plants Administration authorizes small defense manufacturers and fabricators to set up production pools to handle contracts that are too large to be handled by one firm alone.

New Powers—In addition, the following new federal powers are now in the hands of SDPA:

1. Power to classify manufacturing firms according to size.

2. Authority to make economic studies of small business defense problems, excluding such surveys as National Production Authority, or its successor, finds necessary to perform.

3. Right to coordinate inventorying of smaller firms' available output capacity.

4. Authority to develop and distribute managerial aids to small business.

These responsibilities were outlined in a White House executive order transferring personnel, records, property and unexpended funds of Office of Small Business to SDPA. Exact decisions on the scale of the transfer are problems for the Budget Bureau. This transfer had been awaited.

Gets the Bill—Congress has received President Truman's request for $28 million to operate SDPA. All except $3 million of this amount would be used in a revolving fund allowing SDPA to accept federal prime contracts and subcontract the job to small firms. An additional sum, not yet named, will be sought for the agency in a supplemental request.

Announced top figure for the ultimate size of SDPA is 600 employees, or about one-third the number Smaller War Plants Corp. had on its roster at its peak period. The agency plans to assign representatives to look after small business interests at some 80 military procurement offices in the field.

New Rulings—Comptroller General Lindsay C. Warren ruled last week that defense contracts need not be awarded to the lowest bidder where advertising procedures are used. This extends to advertised bidding the previous authority of procurement agencies to negotiate contracts with small firms or those in distressed labor areas even though a lower price might otherwise be obtained elsewhere.

Government agencies are also empowered to allow small businesses to scale their bids down to the level of the lowest bidder and to participate in the procurement. Price differentials may be paid where competitive bidding is used if such action would be in the public interest or necessary to defense.

Not available yet, but sought by SDPA, is a precise directive drawn up by military and civilian procurement agencies to prescribe the manner in which cost differentials may be used to give small or distressed-area firms a larger portion of contracts.

"The Army doesn't want this generally known . . ."

Military Spending Up to Snuff

Army, Navy, and Air Force are well on their way to spending the $49.7 billion available for contract obligation in the procurement and construction fields during fiscal 1952.

From July through December, the defense agencies obligated $18 billion for buying of major equipment and supplies for military construction, and for plant expansion. Air Force led the way with $7.6 billion, followed by the Navy with $5.5 billion, and the Army with $4.9 billion.

Procurement of "hard goods," including aircraft, ships, and tanks, required obligation of $15.2 billion. Funds for clothing, subsistence, and petroleum amounted to $1.9 billion, while construction cost $900 million.

The figure for hard goods includes $800 million to buy materials for use in the Mutual Security Assistance program.

Wilson Bares Plant Sale Plan

Defense Mobilizer Charles E. Wilson last week outlined a plan whereby government-owned plants would ultimately become the peacetime property of private enterprise.

Under this plan, American citizens would be allowed to exchange defense and other government bonds for shares in private industries arising out of atomic and other emergency facilities, now privately owned.

Mr. Wilson said that these industries should be privately owned and managed, with stock offered to anyone interested. The bond swap would, he feels, make defense bonds more attractive.

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Industrial Briefs

New Line—Production of a new line of heavy duty double housing planers, to be sold under the trade name MARTIN, has been started by the Hamilton Div., Clearing Machine Corp. In some cases, the new planers will be sold through the same representatives who handle Clearing presses.

Headquarters Established—The NONFERROUS SCRAP METAL MOBILIZATION COUNCIL has established scrap drive headquarters at 205 East 43rd St., New York. T. E. Veltfort, manager of the Copper & Brass Research Association, is chairman, and J. C. Blake, director.

Chairman Named—James G. Lyne, of New York, editor of *Railway Age*, has been named chairman of the organizing committee of the EIGHTH PAN AMERICAN RAILWAY CONGRESS, to be held in the United States in the summer of 1953.

Output Tripled—A $2,500,000 expansion plan for FANSTEEL METALLURGICAL CORP, Chicago, will triple the output of selenium rectifiers and increase its output of cemented carbide cutting tools by one-third.

New Management—THE SMITH & MILLS CO., located in the Chicago Daily News Bldg., 400 West Madison St., Chicago, has been acquired from Hamilton-Thomas Corp., by A. G. Bryant, who has become president of the company.

Expansion Program—A major expansion program, calling for the investment of over $13 million and designed to assure an adequate supply of silicon materials for the Armed Services and defense-supporting industries, has been undertaken by DOW CORNING CORP., Midland, Mich. The program is scheduled for completion by 1954.

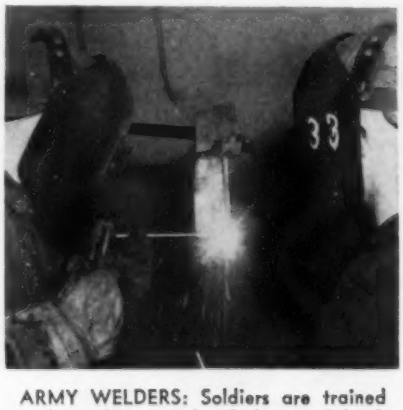
Freight Cars—GREENVILLE STEEL CAR CO., Greenville, Pa., has received an order from the New York, Chicago and St. Louis Railroad Co., Cleveland, for 200 all-steel covered hopper cars with a capacity of 140,000 lb each. Another order from the steel division of Ford Motor Co., was for 100 gondola cars of 70-ton capacity.

Rotary Draw Former—Cyril J. Bath, president of the CYRIL BATH MACHINERY CO., Cleveland, has announced that production of the nation's newest tool to build jet planes has necessitated construction of a branch plant to be located at Solon, Ohio.

Unique Library—Since its opening a year ago, the library of the Bureau of Mines, DEPARTMENT OF THE INTERIOR, Minneapolis, has stored more than 37,500 feet of drill cores from mining projects. This unique library offers industry and Government a free place to store and examine core from mineral exploration projects and invites industry in all sections of the country to use its facilities.

Starts Production—The new OHIO AXLE & GEAR DIV., Timken-Detroit Axle Co., completed months ahead of schedule, has started production of axles and transfer cases for military trucks. The new plant is located at Newark, Ohio.

Moves Facilities—AMERICAN METALLURGICAL PRODUCTS CO., has moved its manufacturing facilities from Hays, Pa., to Newcastle, Pa., where they are rebuilding property formerly occupied by Consolidated Foundry Co. The new plant will be used for the production of metallurgical silicon carbides.



ARMY WELDERS: Soldiers are trained to be welders at the Ordnance School, Aberdeen Proving Ground, Md. Here two soldiers are weld mild steel in one of the welding shop's 60 glare-proof booths.

Fleet Purchases—The tank car fleet of the Union Oil Co., Calif., numbering approximately 600 tank cars, has been purchased by the GENERAL AMERICAN TRANSPORTATION CORP., Chicago.

Appointment—W. C. SCHONBERG & ASSOCIATES, Minneapolis, has been appointed as factory representatives for the Detroit Aluminum & Brass Corp., Detroit.

Division Formed—the FLEXOID CONVEYOR CO., has been formed as a division of the Smith Power Transmission Co., 1545 E. 23rd St., Cleveland.

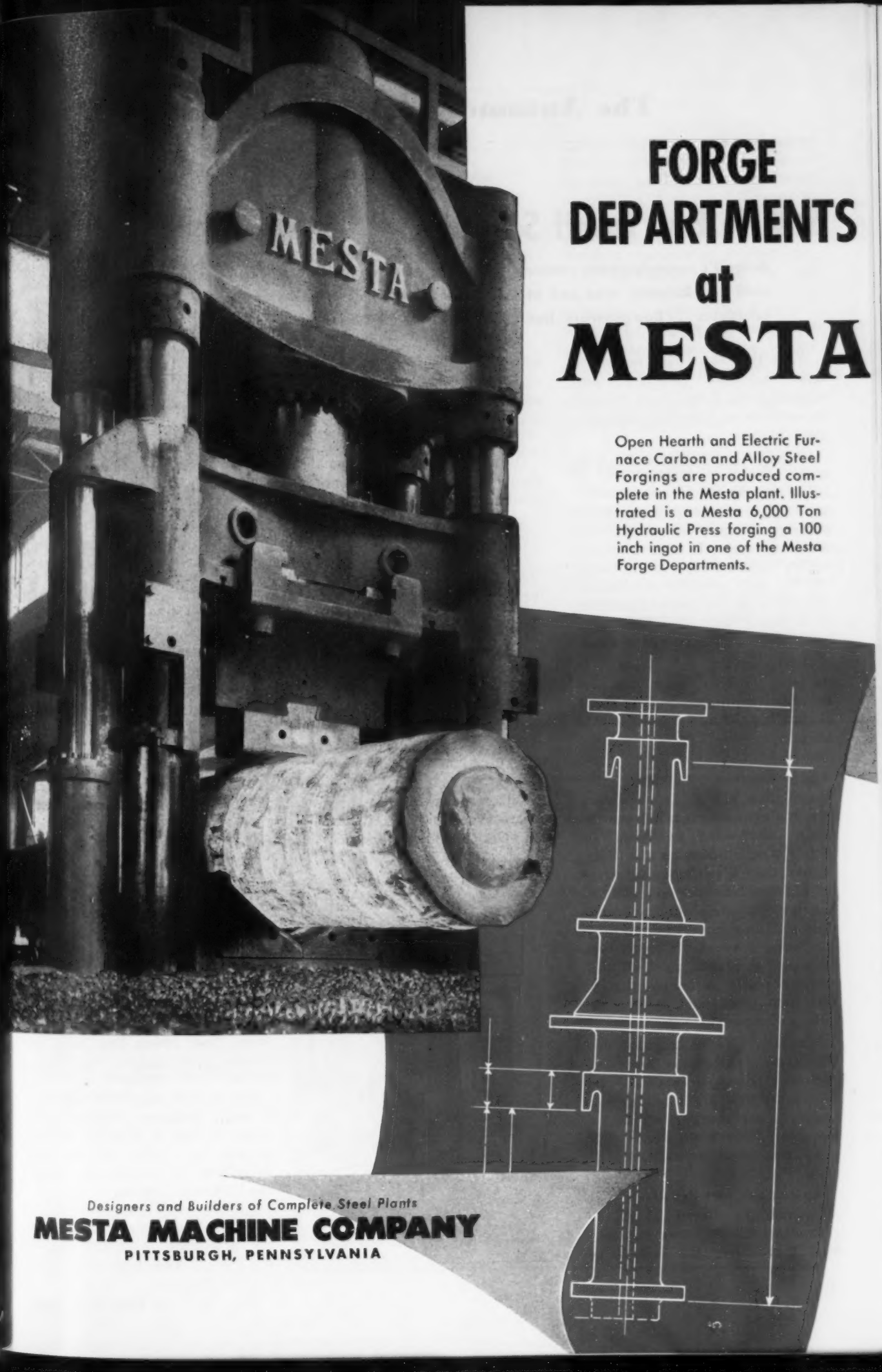
Construction Started—WIGTON-ABBOTT CORP., Plainfield, N. J., announced that construction has been started on the Marlin-Rockwell Corp.'s $3 million production plant near Jamestown, N. Y.

Plant Opened—PRECISION CASTINGS CORP., a subsidiary of Precision Castings Co., Inc., Syracuse, N. Y., opened a new die casting plant, completion of a $700,000 building tion of aluminum, magnesium, and zinc base alloy die castings, in Chicago. Theodore H. Pickering has been appointed works manager.

Completion Announced—CLEVELAND INDUSTRIAL TOOL CORP., manufacturers of Citco Solid Copper Diamond Tools and Citco Hydraulic Diamond Turners, has announced the completion of a $700,000 building and equipment expansion program. L. Red Zeman has been appointed vice-president and general manager.

Guided Missiles—BECKMAN & WHITLEY, INC., San Carlos, Calif., has established a new Guided Missile Products Div. Emphasis in this new specialty will be directed towards design consultation and manufacturing of explosives-actuated devices.

Texas Plant—Construction of a new plant in Paris, Texas, has been planned by the BABCOCK & WILCOX CO., New York. This will be the third new plant to be announced by the company within a year.



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Still No Easy Layoff Solution

Detroit's unemployment remains a problem after committee's visit . . . Industry asks end of "discrimination", higher auto schedules . . . Rap planners' bad guesses—*By W. G. Patton.*

When the smoke had cleared following last week's visit of the Government Task Force, there was still no solution to Detroit's unemployment problem.

Government representatives were given plenty of suggestions, by both Detroit labor and management. Two suggestions were made politely, firmly, and often: (1) Washington should stop "discriminating" against the auto industry, (2) the only possible solution to the city's unemployment problem is to boost auto schedules to a million or more units per quarter.

Detroit sees no other answer to its labor problem, no matter how hopeful Washington may be about channeling defense work into this area.

Bad Guesses — Detroit thinks Washington has made some serious mistakes in planning the defense effort—and has said so. H. S. Vance, Studebaker chairman, argued that Washington's failure to differentiate between nickel-bearing stainless and chrome-type stainless has had some serious consequences. Chrome-type stainless, of course, went off allocation recently. A few months ago this item threatened to stop the auto industry cold.

Similarly, Vance argued that Washington authorities have consistently failed to recognize the auto industry's big need for secondary — not virgin — aluminum. Secondary aluminum, Vance said, has little use in the military program.

An average auto has about 13 lb of aluminum. Given 13 lb of aluminum, the industry can produce a car weighing 3000 lb of which about 80 to 85 pct of the value is labor. This is all made possible by only 13 lb of secondary aluminum, Vance contended.

Output Behind—Automobile production in U. S. plants is climbing but output still lags far behind 1951. At this time during 1951, car assemblies were averaging 100,000 units per week. The 1952 production figures are more than 40 pct below this level.

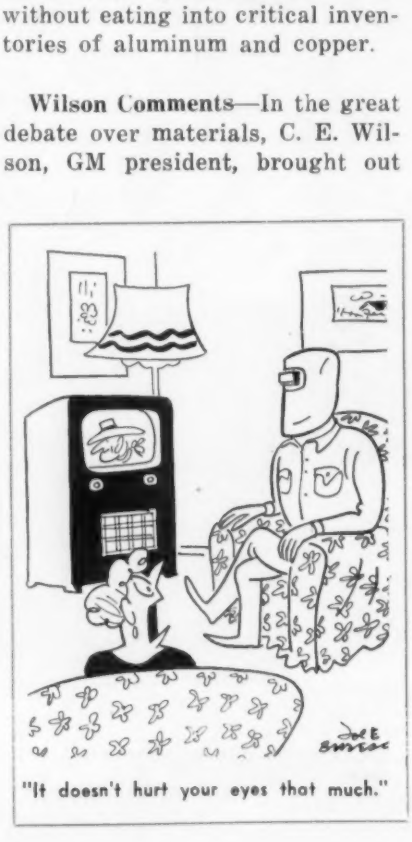
To meet its quota of a million units during the first quarter, assembly lines will have to turn out nearly 90,000 cars a week through the end of March. While this is possible, the industry has serious doubts about producing this much without eating into critical inventories of aluminum and copper.

Wilson Comments—In the great debate over materials, C. E. Wilson, GM president, brought out several things that have not hit the headlines.

There has been so much hullabaloo about leaving copper and aluminum out of cars that some people are now beginning to feel they aren't getting a good automobile, Mr. Wilson suggested.

At the same time he scoffed at claims that the industry can't sell its cars. Car delivery rates at the moment indicate a great car shortage next spring, Wilson predicted.

He also said used car prices are much too high compared with any prewar basis. A 2-year-old car is still worth 70 pct of the new car whereas it used to be worth only 55 pct of its original sales price in the prewar era.



"It doesn't hurt your eyes that much."

Bottleneck?—Are machine tools the bottleneck in the defense program? Deliveries are improving but lack of only a few tools is holding back defense production. Jet engines are an example.

At the recent Detroit meeting, H. S. Vance, speaking for Studebaker, pointed out that his company's jet engine program calls for 1410 machine tools. Studebaker has them all except eight No. 5 Gisholts, he said.

New Fords—Featuring an all-new body, a new 6-cylinder overhead valve high compression engine and a number of interesting engineering changes, the 1952 Fords made their debut last week.

Ford's front end styling features a triple-spinner, air-scoop grille and a 1-piece windshield. Body lines sweep back from the center rear behind the license plate.

Again this year Ford will offer three different transmissions. Foam rubber is used in all passenger seats. The gasoline tank fills from the center rear, under the license plate.

Other Features—Wheelbase of the new cars is slightly longer

Turn Page

than the earlier model. The car has a more rigid frame and a new steering linkage.

Instrument panel has been redesigned. The heater unit is located under the hood. An adjustable door permits warm air to enter directly to the right front seat.

Heavier Frames—Ford is offering four different sets of front coil springs for passenger cars and two springs designed especially for three station wagon models. The new K-member frames are heavier and have five cross members.

Horsepower of the V-8 has been boosted to 110. The 1952 cars are available in more than 80 color, trim and upholstery combinations.

Build Jet Plant in March

Ford Motor Co. will supervise construction, beginning in March, of a $50 million jet aircraft engine assembly and test plant at Romulus, Mich. The facility is scheduled as a Naval Industrial Reserve plant.

Completion is expected during the spring of 1953. The plant will comprise a main building containing 500,000 ft of floor space, 18 engine test cells, and a test structure, on a 160-acre site.

When completed, the Romulus unit is to be used in connection with part of a Lincoln-Mercury assembly plant now being built at Wayne, Mich., for J-40 jet engine fabrication and sub-assembly. About 2400 persons will be employed at the two plants when the standard production rate is reached.

Wilson Raps Machine Tool Plans

In his testimony last week GM's Wilson hinted his company was none too happy with its machine tool program. If he ever saw a shotgun marriage, it involved the Bullard Machine Tool Co. and General Motors, Mr. Wilson told the government task force. He added the same kind of thing exists with some of the aircraft companies.

Contracts:

Fisher officials and Washington planners to map new production.

Officials of the Fisher Body Div. of General Motors Corp. were scheduled to meet this week in Washington with the government to discuss production intended to replace a cancelled subcontract to produce machine tools.

Cancellation by General Services Administration of the $67 million contract was ordered last week by National Production Authority. It involved 757 Bullard "Cutmaster" vertical turret lathes which Air Force believed were needed for jet engine production.

Too Much?—Meanwhile, repercussions of the cancelled contract were heard on Capitol Hill. A congressional subcommittee wanted to know why the contract was made in the first place as well as why the Fisher estimate was so high.

Fisher's estimated cost was about $90,000 per tool, it was said, against Bullard's price of about $38,000. Swan Bergstrom, NPA's machine tool expert, said that about $23,000 of the difference in cost resulted from Fisher's inexperience in machine tools and that the rest represented tooling up.

It was estimated that GM had already spent about $10 million in tooling up operations. This will have to be paid by GSA under the pool contract unless the tooling already installed can be turned to other production following this week's meeting between the company and government.

GM Dealers' Inventories Down

General Motors has reported its dealers' stocks are down about 15,000 units compared with a year ago. In other words, GM sold every car and truck it made last year and about 15,000 more. "When anyone says that GM is going to have automobiles running out of its ears next spring, that man doesn't know anything about the automobile business," C. E. Wilson, GM president, said recently.

THE BULL OF THE WOODS By J. R. Williams

I HATE THEM PARLOR PANICS, BUT I PROMISED THE OL' LADY I'D GO, AN' YOU KNOW HOW THAT IS--WHEN YOU PROMISE 'EM ANYTHING!
YES, TH' BULL DOES KNOW HOW IT IS-- AN' IF TH' WIVES KNEW HOW MUCH THEY'LL DO FOR A GUY ON A HURRY-UP JOB, THEY'D KNOW HOW MUCH INFLUENCE THEY REALLY HAVE IN EVERYTHING!
I WOULDN'T WANT MINE TO KNOW A THING LIKE THAT-- SHE'D SAY, "WHY DIDN'T YOU GET 'EM TO POLISH THEM FILTHY SHOES AND WASH THEM GREASY OVERALLS?"
T. M. Reg. U. S. Pat. Off. Copr. 1952 by NEA Service, Inc.
THE MAN OF THE HOUR
J.R.WILLIAMS 2-15

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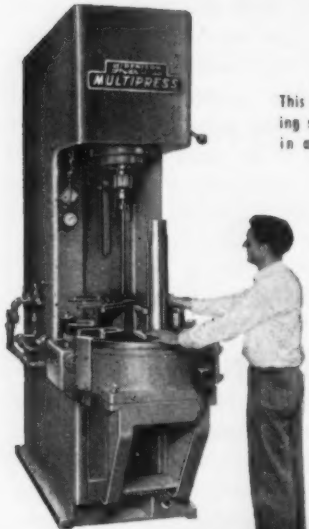

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Western Steel Market Softening

Mill salesmen asking customers for more CMP tickets . . . Bars, structurals, and small shapes easy . . . Pig iron demand has dropped, with cast scrap below ceilings—*By R. T. Reinhardt.*

This is going to be hard for a lot of steel users to believe, but the cold fact is: The western steel market is softening.

Warehouses aren't bulging and there is no idle time on the mills, but jobbers are better stocked now than at almost any time since June of 1950 and mill salesmen are calling customers asking for CMP tickets. Steel imports are practically nil with even the most avid steel users shying away from premium prices.

Not For All—True, this situation does not apply across the board in all items or grades. It is true of many structurals, bars and small shapes. Flats are still tight, but some warehouses even have modest stocks of this item.

Whether it is significant or not, it is interesting to note that in Los Angeles one warehouse is going after additional business by extending its delivery service far beyond the usual limits at no added cost to the consumer.

Principal reason for easing of structurals and bars is given as curtailment of construction by high costs as well as government restriction.

San Francisco office of NPA had been informed that venetian blind makers in northern California were being hard hit by lack of steel and aluminum, but on investigation reported a shortage of orders was more acute.

Iron Demand Down—An appreciable drop in demand for both cast iron scrap and pig has shown up in the past few weeks. Engine blocks have been slow to move in some western areas even below ceiling prices and domestic pig producers are soliciting orders among foundries. Again curtailment of building construction is held responsible.

Soil pipe producers are operating well below capacity.

Probably the last pig iron to be imported for some time came into Seattle last week—about 3500 tons—on an old order and at a price comparable to domestic. Brokers are skeptical of being able to sell much, if any, more at the current prices.

Scrap Still Scarce—Tight factor in the steel business in the West continues to be scrap for steelmaking furnaces. In southern California the 28-day strike at the Torrance Plant of Columbia-Geneva Div. of U. S. Steel gave some relief the hard way—by losing about 18,000 tons of furnace production. Workers returned to their jobs last week.

Pacific Northwest furnaces are still on hand-to-mouth basis with the only relief in sight the possible scrapping of six ships put up for bid by the government, two of which are anchored at Olympia, Wash., and a break in the weather.

Members of the International Longshoremen's Union are reported considering asking for combat rates while unloading overseas battlefield scrap. They contend it's dangerous and cite fatal explosions such as that in Seattle last fall when a shell exploded. A $100,000 damage suit has been filed.

"We'd better forget this time and motion study program. It's speeding up production so fast we're running out of raw materials!"

Conjecture — Recent announcement that Columbia-Geneva had given an option to lease its old Alcoa plant at Los Angeles to Douglas Aircraft Co., Inc., raised a few questions among steel buyers. When the plant was bought by U. S. Steel from the government in 1948, it was announced that a cold reduction mill would be installed.

Best guess is that with the doubling of cold reduced sheet and tinplate capacity at the Pittsburg, Calif., plant, expansions in the Los Angeles area will center at the Torrance plant. It is believed studies have been under way for some time on the practicability of putting in a merchant pipe and wire mill there. Even if found economically feasible, it will probably be quite a while before realization.

Still Likely Producer—Although the principals aren't talking, it is clear that the company known as Western Tube is definitely planning an electric furnace and tube-producing operation. Although a Texas site has been considered, it seems Dominguez, between Long Beach and Los Angeles, is favored. Ninety acres have been optioned there by the group which includes Nicoli Malaxa and A. Fulga with headquarters in New York. A $10 million certificate of necessity has been issued for the project.

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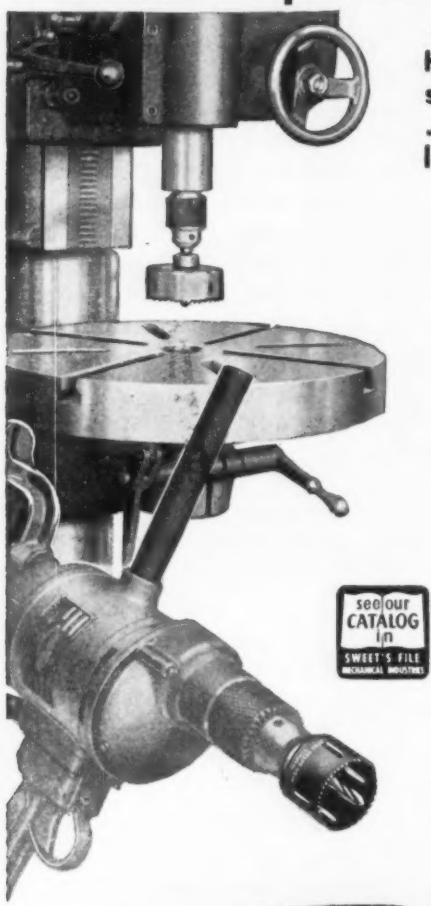
. . . thru any machineable material up to *1⅛ INCHES* thick!



Here is a premium tool which makes it possible to saw holes in one short operation . . . large holes which heretofore had to be laboriously machined "a-chip-at-a-time."

MARVEL High-Speed-Edge Hole Saws have strength to withstand the terrific peripheral strains of heavy duty operation in lathes, drill presses or portable power tools. They have a high speed steel cutting edge which is electrically welded to a tough, alloy steel body, high speed steel pilot drills, heavy hexagonal shanked arbors and sufficient set for deep drilling. They are self-aligning, as the larger diameter saws float on their arbors and are driven by double drive pins. They will saw round holes accurately in any machineable material.

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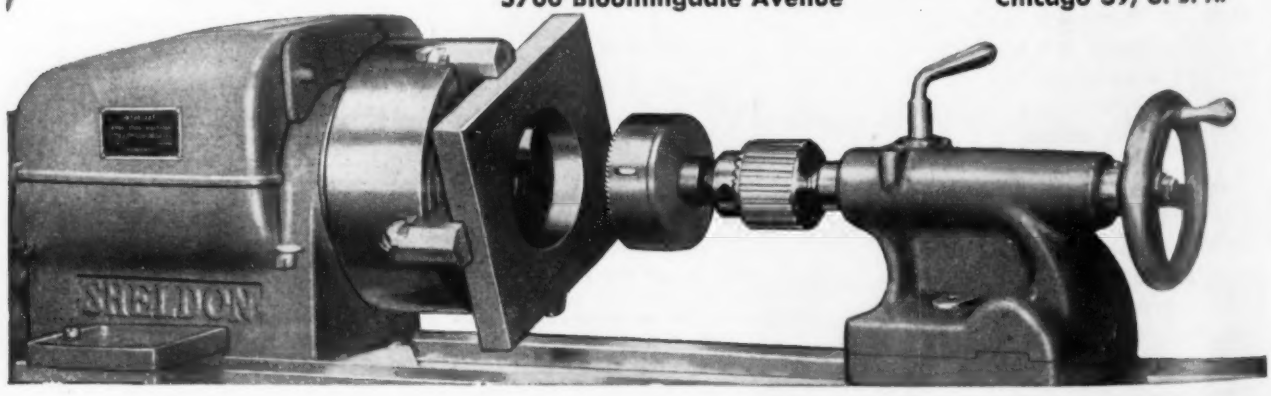

Do You Want Stockpile Business?

Washington planning to invest $3 billion in stockpiling standard machine tools . . . Would fill current orders first, cushion order lag . . . Want to free industry for war work—*By G. Elwers.*

The machine tool industry this week is giving a $3 billion gift horse a thorough look in the mouth. First reaction of many industry leaders is that they don't like what they see.

The $3 billion is an amount Washington is reportedly considering investing in machine tools to be stockpiled against the possibility of a future all-out war mobilization. As tentatively advanced, the plan would be to start buying after the present high machine tool backlog is pretty much worked off. A substantial amount, $3 billion or more, would be invested over a period of 4 years in all types of production equipment, mostly standard machine tools.

These would be scientifically protected against deterioration and stored against the possibility of war. If war and all-out mobilization comes, these machines would be made available for the expansion of war production, it is claimed.

Prevent Shortages — Purpose of the plan is primarily to prevent recurrence of the present situation which finds military production lagging due to a machine tool shortage. The normal peacetime capacity of the machine tool industry simply isn't enough to take care of the huge demands made on it when military productive capacity has to be rapidly expanded, the plan's sponsors feel. Therefore, they say, why not stockpile tools in advance?

It is realized, of course, that tooling up for production of such items as jet engines and tanks requires some special machine tools designed and built for the exact item being manufactured. It would be impossible to plan such machines in advance.

Therefore the plan would be to stockpile only standard machine tools; versatile, multi-purpose machines which will be needed in quantity regardless of the design of the products which will go into production when and if war comes. This, Washington thinks, would then leave the machine tool industry free to concentrate on building the special tools when the time for mobilization comes.

Big Help Later—A secondary advantage of the plan, its sponsors claim, will be the large investment in machine tools at a time when the industry's incoming orders will be rapidly falling off. It is pointed out that the tooling-up phase of the present defense program will end in a few years and the present high level of machine tool orders will fall off.

Civilian orders are not expected to keep the industry at its present high level. An additional $3 billion in orders spread over 4 years would help stave off a depression in the industry like the one which followed World War II.

Some industry leaders have expressed tentative qualified interest in the stockpiling plan, withholding judgment until more details are available. But comments from most industry sources condemn the plan with adjectives ranging from "socialistic" to "crazy." Here are some of the objections.

Hard to Estimate—It is impossible to determine in advance what quantities of different types of machine tools will be needed to produce the weapons of a future war. The quantities of tools used to produce piston aircraft engines in World War II were not the same as are now needed to produce jet engines. Fewer of some types are needed, and many more of other types. Production of the next war's guided missiles will require a different tooling pattern.

Can planners determine the needs in advance? The record is not good. Responsibility for the current machine tool bottleneck can basically be laid to Washington's belief that the machine tools stockpiled after World War II would serve to get jet engine production going. Actually, when current jet programs started, it was found many thousands of new tools were needed.

New Work Arises—Even if the standard machines are stockpiled they cannot be readily made available for war production. They still need to have special tooling designed especially for the weapons they are to produce. On some so-called standard machine tools, more than half of their cost and manufacturing time is taken up by design and production of this tooling.

A third objection is that even if standard tools from storage could be readily made available for war mobilization, weapon tooling programs would still have to wait for the special machine tools to be designed and built. Production lines would be idle until these machines could be delivered.

It is a mistake to assume that with standard machine tools already built and stockpiled, the entire machine tool industry could go to work and turn out special machines in short order.

Advance Building — The firms which build standard machines could not design and manufacture special machines with equal facility. Thus advance building of standard machine tools would do little to prevent a bottleneck in machine tools from developing in the event of all-out mobilization.

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The Iron Age

SALUTES

Franklin G. Smith

Completes 60 years at helm of company he founded. A leader in foundry equipment manufacture.

FINAL development of a revolutionary automatic core-making machine was recently announced. The automotive industry views the new core maker as an outstanding achievement in mechanical molding technique.

To Franklin G. Smith, 84-year-old chairman of the board and founder of The Osborn Mfg. Co., it is just one more contribution to industrial progress made by his company. President of the company until recently, Mr. Smith helped celebrate Osborn's Sixtieth Anniversary last week.

A force of over 1000 employees has grown from a nucleus of eight people. Hearing that a small concern manufacturing flat wire brushes was for sale, Franklin Smith borrowed $2800 to add to his savings of $200 and bought the company. He has led his firm to its position as one of the world's largest producers of industrial brushes and foundry molding equipment.

Born in Bellevue, Ohio, the son of a general store proprietor, Mr. Smith had to forego formal schooling after he was 11 years old. His first job, which paid $4.16 a week, was with a hardware concern.

Rising at 6:30 every morning, Franklin Smith does his setting-up exercises regularly to keep in trim. He still takes an active interest in the company and reports to work every day.

Although he keeps abreast of every new development Mr. Smith divides his time between offices at Osborn's plant in Cleveland and the Ohio Rubber Co. in Willoughby, Ohio, where he also serves as chairman of the board.

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Those are three mighty important advantages to any manufacturer — especially today. The Meyer Furnace Company, Peoria, Illinois, did it by using only 24 SPEED NUTS on their Oil-Fired B Series Furnace. *Reports reveal a savings of 15 minutes assembly time per unit and a 25% reduction in the reject rate.*

The third advantage is highly important to a furnace manufacturer. Anything he can do to make the dealer's installation job easier and quicker means a tremendous premium in improved dealer relations. Meyer accomplished this by changing from fixed, welded bolts to SPEED GRIPS* for attaching the pressure oil burner. This change in installation *eliminated dealer complaints on time wasted due to misalignment of bolts and burner flange.*

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Detail sketch shows location of 4 bolts retained by 4 SPEED GRIPS. Flange of oil burner placed over SPEED GRIPS. Bolts through flange are easily aligned due to "float" provided by SPEED GRIPS. No need to bend bolts and damage threads. Burner is easily installed, easily serviced.
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FASTEST THING IN FASTENINGS®

The Iron Age

INTRODUCES

William E. Grace, executive vice-president and general manager, Hobbs Manufacturing Co., Fort Worth, elected president, TRUCK-TRAILER MANUFACTURERS ASSOCIATION, Washington.

Richard M. Burke, elected vice-president, SOUTHWEST SUPPLY CO., Denver.

George C. Wilder, elected vice-president and assistant general manager, MACWHYTE CO., Kenosha, Wis. **Jessel S. Whyte,** elected president and general manager; **H. E. Sawyer,** elected vice-president and treasurer; **R. B. Whyte,** elected vice-president in charge of operations; and **R. P. Tyler,** elected vice-president in charge of sales.

Dennis E. Harvey, elected vice-president, Washington offices, MAGNESIUM COMPANY OF AMERICA, Chicago. **William Johansen,** appointed general sales manager, and **Charles J. Futterer,** appointed southwestern division manager.

Victor Mancuso, elected executive vice-president and assistant general manager, AXELSON MANUFACTURING CO., Los Angeles.

James C. Richards, Jr., elected vice-president, sales, and **Allyn I. Brandt,** appointed general merchandising manager, B. F. GOODRICH CHEMICAL CO., Cleveland.

John G. Bannister, appointed vice-president in charge of manufacturing, NATIONAL AUTOMOTIVE FIBRES, INC., Detroit.

Everett E. Gramer, vice-president, has assumed the duties of western sales manager, GRAMER TRANSFORMER CORP., Chicago.

Charles Harrison Barnett, appointed assistant to the president, FOUNDRY EQUIPMENT CO., Cleveland.

Fabian W. Kunzelmann, appointed manager, electrical manufacturer sales; **Carl D. Dimity,** appointed manager, utility sales; and **John C. Williams,** appointed manager, rod and wire sales, PHELPS DODGE COPPER PRODUCTS CORP., New York.

S. C. Allyn, president, National Cash Register Co., elected a member of the Board of Directors, ARMCO STEEL CORP., Middletown, Ohio. Mr. Allyn succeeds **E. A. Deeds,** who has resigned.

Walter N. Wilhelm, appointed sales manager, Central Div., DOBECKMUN CO., Cleveland. **Daniel R. Moroney** and **Albert W. Thornton,** named district managers, Milwaukee, Minneapolis and St. Paul territories, and **John E. Powers,** appointed sales representative, Milwaukee district.

J. E. Kessler, appointed chief engineer, appropriation analysis and preparation, U. S. STEEL CO., Pittsburgh. **N. C. Michels,** appointed chief engineer, project development, and **E. L. Tindall,** appointed chief engineer, manufacturing.

John C. Cercone, appointed manager of sales, Sheet Div., PITTSBURGH STEEL CO., Pittsburgh.

M. W. Acker, director and vice-president, named general manager, Metals Div.; **M. F. Meissner,** named assistant general manager; **W. C. Schade,** named general manager, Arms and Ammunition Div.; **W. S. Allen,** named general manager, Electrical Div.; **N. A. Hamilton,** named general manager, Explosives Div.;

O. E. GUIBERT, JR., vice-president, appointed general manager, Guibert Steel Co., Pittsburgh.

LESTER C. HIGBEE, elected president, W. & L. E. Gurley, Troy, N. Y. He succeeds Charles E. Smart, who has retired.

FRED W. RICHARDSON, appointed general superintendent, Pittsburgh plant, Heppenstall Co., Bridgeport, Conn.

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Personnel

Continued

O. E. Nelson, named general manager, Export Div.; and **G. L. Dawson**, regional manager, appointed staff assistant to the executive vice-president, OLIN INDUSTRIES, INC., East Alton, Ill.

Charles R. McCormick, named manager, Green Island, N. Y., plant, FORD MOTOR CO., Dearborn, Mich. He succeeds **D. C. Carter**, who has resigned.

Howard E. Hastedt and **Willard C. Van Keuren**, named managers, Chicago and Philadelphia districts, WYANDOTTE CHEMICALS, Wyandotte, Mich.

Charles N. Chalfant, appointed manager of industrial cleaner sales, HANSON - VAN - WINKLE - MUNNING CO., Matawan, N. J.

George F. Sindelar, appointed sales manager, VARIETY MACHINE & STAMPING CO., Cleveland.

Stewart C. Rogers, appointed district manager, BARON STEEL CO., Toledo. He succeeds **J. Mikolajczak**, who has joined the purchasing department, Kaiser-Frazer Corp.

Rolf Griem, appointed controller, A. M. BYERS CO., Pittsburgh. He succeeds **Carl G. Jensen**, who has retired.

P. E. Holder, appointed assistant district manager, St. Louis district, AMERICAN CYANAMID CO., New York.

Captain E. E. Roth, appointed director of engineering, LVT Section, Kalamazoo, Mich., works, Ingersoll Products Div., BORG-WARNER CORP., Chicago.

O. D. Rice, chief engineer, appointed manager of operations; **Leonard G. Meier** promoted to chief draftsman; and **Richard W. Ewalt** promoted to assistant manager of sales, RUST FURNACE CO., Pittsburgh.

B. A. Bauer, appointed purchasing agent and supervisor of stores, Oil City, Pa., plant, WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J.

Jack G. Copeland, Jr., named works manager, Carthage, Mo., plant, HERCULES POWDER CO., Wilmington, Del. He succeeds **John C. Foster**, who will manage the Radford Arsenal, Radford, Va.

WILLIAM G. THANNERT, named factory manager, Trackson Co., Milwaukee.

WILLARD J. DYE, named assistant to the vice-president, Hydropress Inc. & Loewy Construction Co., Inc.

DON H. KREY, appointed vice-president in charge of sales, Homestead Valve Mfg. Co., Coraopolis, Pa.

JOHN W. FORCE, appointed vice-president in charge of engineering, Homestead Valve Mfg. Co.

TOOLING INNOVATIONS

the Iron Age
FOUNDED 1855
Technical Articles

aid small parts production

By Herbert Chase
Consultant
Forest Hills
New York

Here are some valuable tooling ideas from Buick's small parts plant, both on mass production and on small-lot jobs. A simple rig takes the place of a pitch-line chuck in gear production. A special machine burrs holes on 8000 small pieces an hour. A simple screw-machine pickoff device prevents damage to threads. Special trucks simplify handling bar stock for screw machines.

Many interesting tool engineering ideas are in evidence at General Motors' Buick Div. in the building devoted to production of small parts. Some setups here are for high production. In others, setups have been designed to give good results though the quantities produced are too small to justify elaborate tooling.

An example of the latter is a gear job not in high production. These gears have precision-cut teeth and, after heat treating, must have the hole ground. Runout must not exceed 0.002 in. in relation to the pitch diameter. Normally, this would call for a pitch-line chuck. But as none was readily available, to get in production soon, the setup shown in Fig. 1 was devised.

A steel ring was hardened and set in a hole in a face plate, which was heated so as to shrink around the ring and grip it tightly upon cooling. This plate was applied to a Heald internal grinder and the hole in the ring was

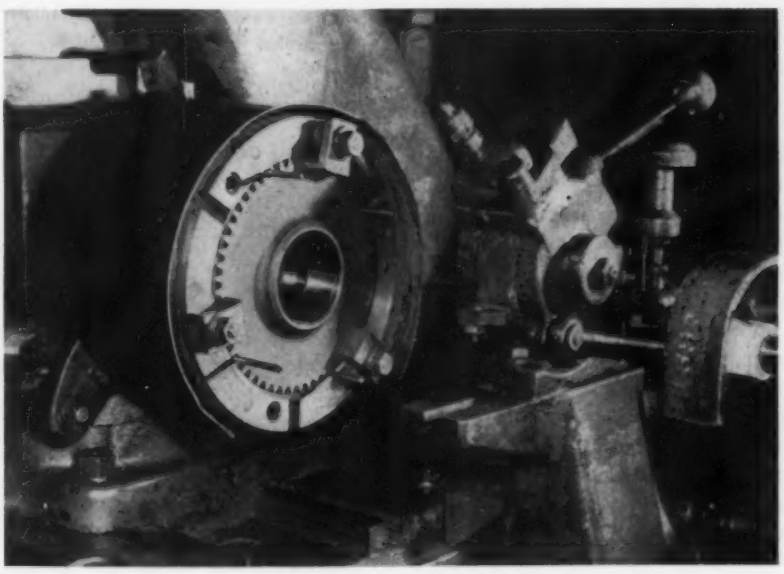

FIG. 1—Special device to hold gears for precision grinding of bore used instead of pitch-line chuck. Four pins are used to locate gear accurately.

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ground to a size about 0.025 in. larger than the OD of the gear. Four pins were centerless-ground to such a size that, when inserted between the ring and gear teeth, about 90° apart, they bear on the pitch line of the teeth and center the gear so the pitch diameter is precisely concentric with the ring bore. Three pins could be used but four insure better centering on gears that have an odd number of teeth.

When thus located, the gear is clamped by tightening nuts on three buttons and runs perfectly true while the hole in the gear is ground to size. After grinding, gears are checked on a Red Liner. Although the total indicator reading on runout permitted is 0.002 in., the check seldom shows in excess of 0.001 in. runout, or about half that guaranteed when a pitch line chuck is employed. This improvised method of hole grinding has thus proved capable not only of holding to closer limits than with a pitch line chuck but of doing the job fully as fast.

Lower caps used on the pushrods for valve operation in Buick engines are short hollow cylinders having one end domed and drilled with a small hole. Specifications call for burring the outer end of each small hole. Since the number of caps required is large, tooling for rapid automatic burring is justified. To do this job at the rate of about 8000 pieces an hour, the machine shown in Fig. 2 has been built.

Carbide-tipped drills burr holes

A set of three rotating hoppers are set above a circular base with a fixed circular platform supporting a notched dial. This dial is indexed one notch each time that a plate, on which three Aro air drills are supported, is elevated. When the plate is lowered, each of the carbide tipped drills enters a hole in a cap and burrs its upper end. Caps feed by gravity into dial notches from the three inclined magazines that the hoppers keep filled. The drills are raised and lowered by a gear-driven cam.

Each cap is indexed into burring position and is there centered by a recess in a hinged lever. There is a clearance hole for the drill above the recess, which fits over the domed end of the cap. Springs raise the levers when the drills are elevated and indexing occurs, but the levers are pressed down when the drills are lowered. After passing through one of the three drilling stations, each cap is indexed over a hole in the plate below the dial and falls down a chute into a tote pan. Each drill burrs 44 pieces per min. Operation is completely automatic save for keeping the hoppers supplied with caps.

Among parts made in this plant is a spool valve, one of the control elements for Dynaflow transmissions. One end of this valve has to be

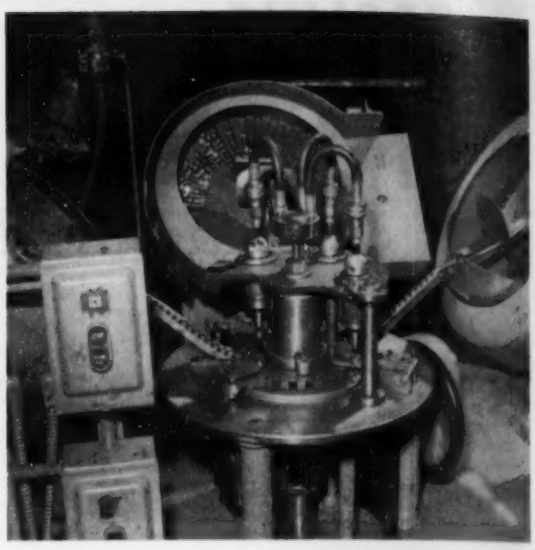

FIG. 2—Buick-designed machine for deburring small holes in 8000 push rod caps per hour.

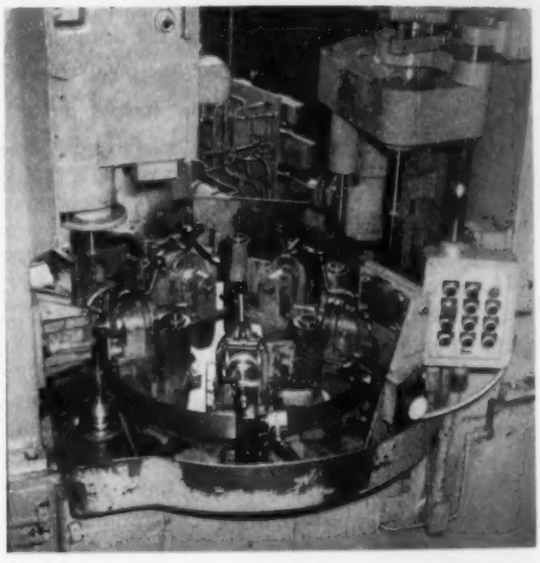

FIG. 3—LeMaire setup for complete machining of milled and drilled fork at one end of hydraulic spool valve.

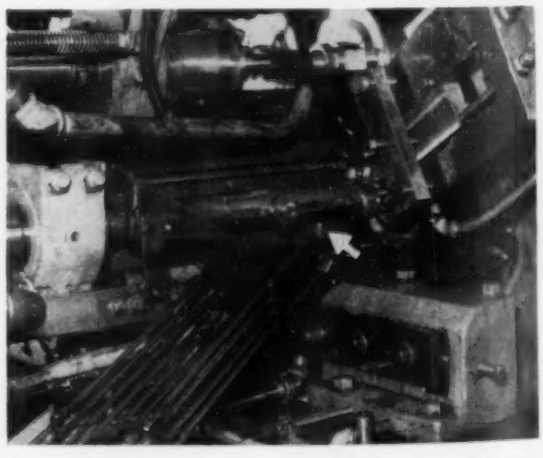

FIG. 4—Simple pickup bar at cutoff station of screw machine drops parts into chute made of tubing. Arrow points to bar pivot point and top of chute.

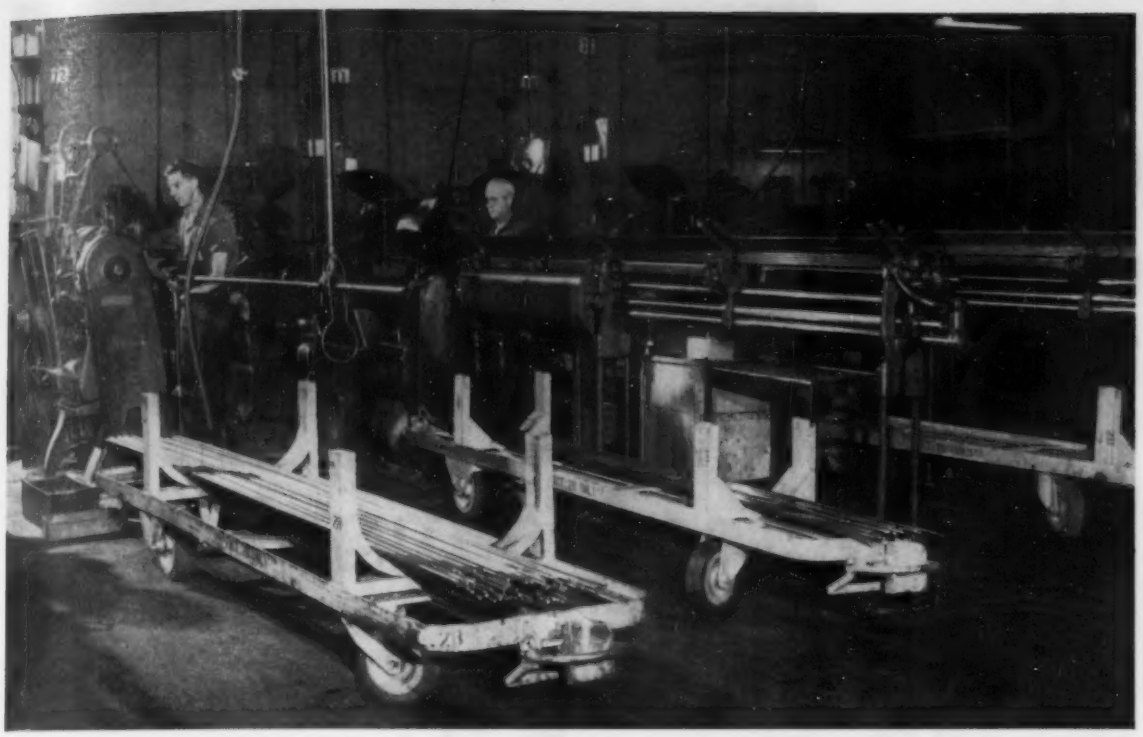

FIG. 5—Narrow trucks hold stock for automatic screw machines, save aisle space. Note hangers for bars.

slotted, drilled and straddle milled to form a fork. These operations were rather slow until the special LeMaire setup, Fig. 3, was put into use. Hand loading and unloading are done at the first station. At the next, vertical drills produce the cross hole. At the third station, a milling cutter is fed in hydraulically to make the cross slot. Two tools are operated by the head at the fourth station, the first being a straddle mill that produces two flats parallel to the slot and the second a line reamer that brings the cross hole to size. To remove burrs at the ends of the fork, the work piece is made to pass over a spring backed file when indexed from the reaming to the unloading station, thus saving a separate hand operation. Total output on this machine is 190 pieces per hr.

Some multiple-spindle screw machines produce caps having, under the head, a short hollow externally-threaded shank. When these caps were cut off the rotating hex bar, they sometimes were thrown in such a way that threads were nicked. This caused rejection or made insertion at assembly difficult. To avoid such nicking, the pickoff device shown in Fig. 4 is now used.

Pickoff is pivoted bar

It is a pivoted steel bar whose outer end is turned down to form a stem having a diameter less than the ID of the workpiece. This stem feeds into the hole in the workpiece at the cutoff station when the turret is advanced. When cutoff occurs, the piece remains on the stem instead of being thrown off. As the bar is retracted, a roller near its outer end rides up a triangular cam. This tilts the bar about a pivot and lets the work piece slide off into a chute down which it slides without nicking threads.

Keeping automatic bar machines supplied with stock has been simplified and delays avoided by providing narrow trucks of the type shown in Fig. 5. These trucks are spotted at the end of machines they supply after towing from the stockroom. Being narrow, the trucks do not obstruct aisles between machines, and stock is always ready at the machine. Moreover, the bars do not have to be unloaded into fixed racks, as the trucks take the place of the latter and thus save extra handling.

No supports on floor

Before these trucks were used, short columns with bases resting on the floor carried eyes in which bar tubes were supported. These columns often were bent by loads on supply trucks being backed against them. This trouble and the resulting delays are now avoided by supporting the eyes from overhead hangers, leaving the floor clear. When only a few bars remain on a truck spotted at the machine, they are commonly hung in wire loops like that shown supported from an eye hanger in Fig. 5. This frees the truck so that it can be taken to the stockroom for refilling. The bars left in the loops keep the machine in use until the truck is returned with a new supply.

In the case of machines equipped with automatic magazine bar feeders, floor supports are retained but there is room for a narrow truck to be spotted back of the feeder and still leave aisle space, as Fig. 5 shows.

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Oxy-natural gas hot-top heating

increases ingot yield

The latest, and possibly the best answer, to the old problem of hot-top size is heating with oxy-natural gas. Up to 10 pct increase in ingot yield is reported and the hot-top weight has been materially reduced. High alloy and stainless steel ingots are now being poured using this standardized method with no bad effects on steel quality. The practice is simple and quick and no water cooling of burners is necessary.

By

A. J. Texter, Supt.
Melting Dept.
Firth-Sterling Steel and Carbide Corp.
McKeesport, Pa.

E. F. Kurzinski
Development Engineer
Linde Air Products Company
Newark, N. J.

FIG. 1—Heating tips in position over the hot tops. The tip at the right is not water cooled, while the other two are.

Over the years many methods have been tried to reduce hot-top size to recover more sound metal in the ingot. Since the purpose of a hot top is to provide additional molten metal as the ingot cools and shrinks, the basic idea is to maintain a molten condition in the hot top as long as practicable. Several methods have been employed to accomplish this. These include the use of insulating materials, and sometimes the addition of elements that will produce exothermic reactions. Processes that offered greater promise, however, were those supplying heat from an external source.[1]

For some time, Firth-Sterling Steel and Carbide Corporation, McKeesport, Pa., had been searching for a practicable method of

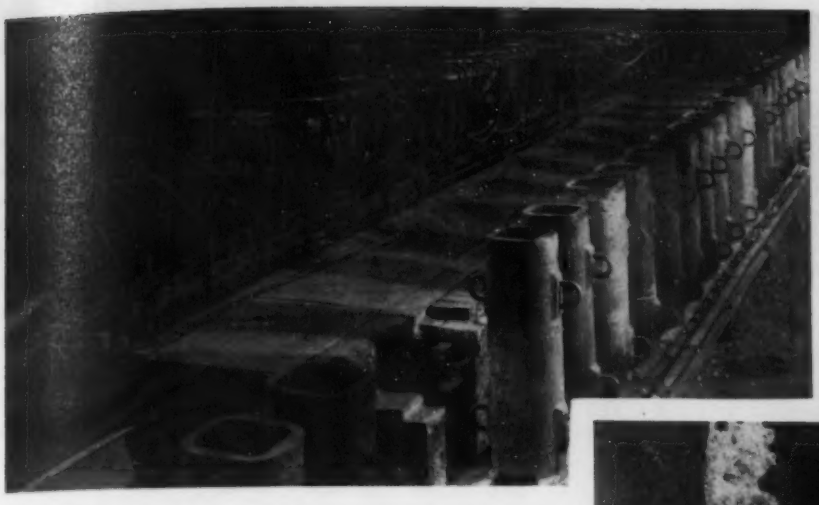

FIG. 2—Pouring floor equipped with oxy-natural gas burners. After metal shut off, one burner is swung over the top of each ingot. Gas ignition is instantaneous and heating continues as long as necessary for any given ingot size.

reducing hot tops which would affect reductions in cost. The company, therefore, agreed to a co-operative development program with Linde Air Products Company, using oxy-natural gas flames for hot-top heating. Results to date indicate that up to a 10 pct increase in steel mill yield appears to be obtainable. Experience at Firth-Sterling indicates that oxy-natural gas burners, without water-cooling, are the most practicable. With new refinements, increase in steel mill yield appears to be obtainable with only a moderate equipment expense and with little modification of present practices.

Oxy-natural gas heating offers some obvious advantages. Almost all steel mills have available an oxygen and natural gas supply. The cost of these gases is not high nor do demand limitations occur as frequently as with other heating methods. The flame is neutral to most steels at oxy-natural gas ratios between 1.4 to 1.5 to 1 and, within these ratios, the flame temperature is approximately 4900°F which is more than adequate to keep the steel fluid.

The first step in the program at Firth-Sterling was to equip up to 24 hot-top heating stands as shown in Fig. 2. These were used to treat 8¾ in. sq., 640-lb. ingots of stainless steel and high-alloy steels. For flexibility of operation the equipment also was designed so that two or more units could be used to heat ingots up to 21-in. sq. (6500-lb.). Several designs of water-cooled heating equipment were tested. The best are the two on the left of Fig. 1.

A type of hot-top casing incorporating a teeming hole and with only 50 per cent the normal volume was utilized. The volume reduction was accomplished by decreasing the hot-top height by one-half. The regular type of hot-top refractory is used for these casings. Fig. 3 shows the hot top from an ingot cast using conventional practice, whereas the ingot in Fig. 4 was cast using oxy-natural gas hot-top heating. Ingots were split longitudinally and samples were taken for chemical analysis. No detrimental changes in chemical analysis or

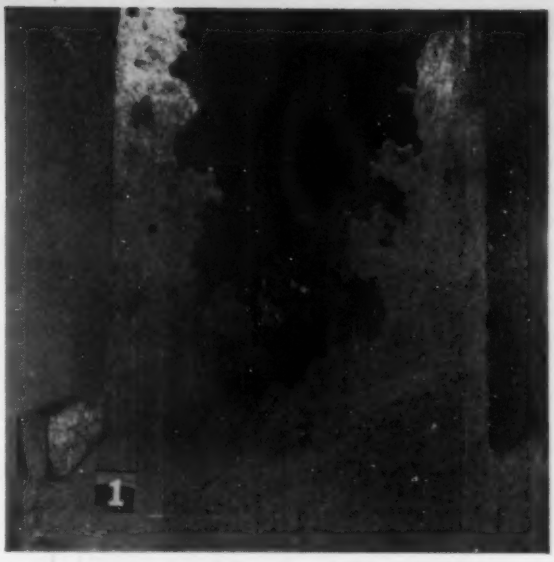

FIG. 3—Typical freezing pattern for regular hot-topped ingot shows shrink cavity and size of area which must be discarded in rolling or forging.

segregation were noted between the heated and the regular practice ingots.

After the initial experiments, it became apparent that several improvements were necessary for assuring day-to-day operation. Scrutiny was given to elimination of water cooled burner tips and the development of heating tips which were less expensive, did not use critical metals, and which could be readily obtained. The elimination of cooling water was desirable, not only because of the inherent

FIG. 4—Oxy-natural gas heated hot top is much smaller and consists of solid metal.

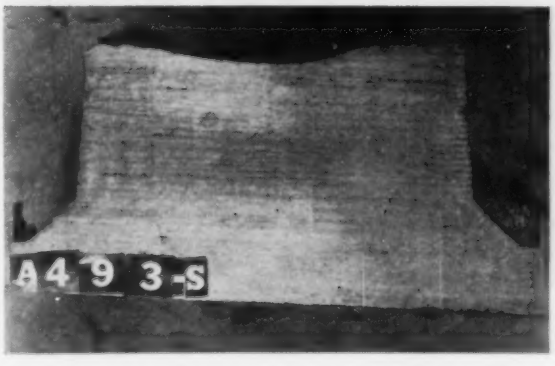

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FIG. 5—Each ingot has its own burner. Simple clean design of gas supply lines, valves and extension arms require a minimum maintenance.

Gas heated hot tops (continued)

hazard of water and hot steel, but because freezing conditions at the pouring platform during winter operation would otherwise have to be overcome by circulating anti-freeze solutions. Also the passages needed to circulate the coolant made the heating tip more expensive.

Standard pipe and pipe fittings were selected from which to make the heating assembly. In this way part replacements were as close as the nearest millwright or storehouse and, with the pipe cap heating tip, the flame pattern could be easily modified by simply drilling additional ports where needed.

The principle which enabled operation without water cooling is unique and is a radical departure from conventional heating head design. In usual heating practice, the flame ports are counterbored to produce a stable flame at high mixed-gas velocities. This is done to enhance heat transfer. A disadvantage is that the counterbore type equipment picks up heat because the flame is in contact with the tip.

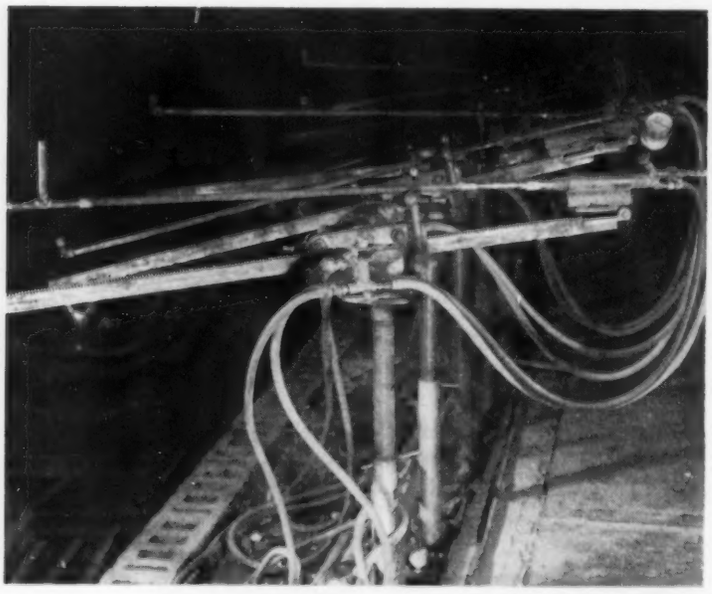


FIG. 6—Burners are swung a 180° arc to center over each ingot. Quick action valves automatically supply fuel.

When the mixed-gas velocities are increased beyond a stable condition and the counterbore eliminated, the flame has a tendency to blow off the tip. If the velocity is further increased, it actually blows out. Since the flame is no longer in contact with the tip, the heat picked up by the tip is markedly reduced and water cooling is not required. The high temperature of the metal in the hot-top maintains gas ignition even under very high mixed-gas velocities. The actual distance between the tip face and the start of combustion depends on the back pressure against which the flame is operating and other factors. Usually this distance is about 3 in. above the top of the molten metal.

Service life for the blow-off flame pipe cap tip was in excess of 200 heats when tested in production, using ordinary steel pipe caps. Substitution of stainless steels or other high-temperature alloys markedly increased the service life over that obtained with steel pipe caps. The blow-off flame proved satisfactory for production and the 24 water-cooled heating heads were replaced with the pipe-cap tips in mid 1951. Hot-top heating as now applied at Firth-Sterling Steel and Carbide Corporation is shown in Fig. 5. A closeup of these tips appears in the headpiece.

Application of process simple

Application of the hot-top heating process is extremely simple. A regulated oxygen and natural gas supply is located near the pouring platform. Each mixing blowpipe receives the gases at identical pressures which maintain the desired gas velocity. Therefore, the oxy-natural gas ratio remains constant. The operation consists of positioning the apparatus, shown in Fig. 6 over the hot-top as soon as possible following teeming. Gas flow is started by a quick-acting valve. The duration of the heating is dependent upon the ingot size and is about 14 minutes for an 8¾ in. sq. ingot. Heating time for ingots 12 in. square is around 22 min. Larger ingots require a longer heating interval since ingot solidification proceeds over a longer time period. At the conclusion of the desired heating time, the gases are shut off and the equipment retracted.

The investigation of the oxy-natural gas hot-top heating process is continuing. Ingots up to 21 in. sq. have been treated with equally successful results. No doubt continued investigation will yield improvements, but in its present form oxy-natural gas hot-top heating has proved successful as a method of easily and economically increasing the yield of stainless steel and high-alloy steels. About 200 cu ft of oxygen per ingot ton is consumed by this method as practiced at Firth-Sterling.

[1] "Electric Hot Topping Steel Ingots," The Iron Age, Mar. 25, 1948, p. 80.

Twelve surfaces and eight bores finished in two setups

By letting broaching do most of the work, machining time of an important tank track part has been enormously reduced, production has been stepped up and cost has been cut.

Although the operations which are performed by broaching include machining two outside faces, machining four locating pads for subsequent machining, and broaching four bores in the relatively thin webs of the flanges, only two machines with one operation each are required. The two machines—a 25 ton 66 in. stroke Dual Ram, and a 30 ton, 66 in. stroke Colonial Pull-down, both produced and tooled by Colonial Broach Co., each produce two parts at a time so that in one complete cycle of the two machines, some 12 surfaces and 8 bores are broached.

All the flat surfaces, both the outside faces and the locating pads, are broached in one setup. After the part has been set up, the locating pads are broached at the beginning of the stroke by the broaches mounted on the face of the rams. Parts are loaded into a trunnion type fixture on a standard receding table. Hydraulic clamping is push button controlled. Trunnioning of fixture is automatic, activated by the receding motion of table.

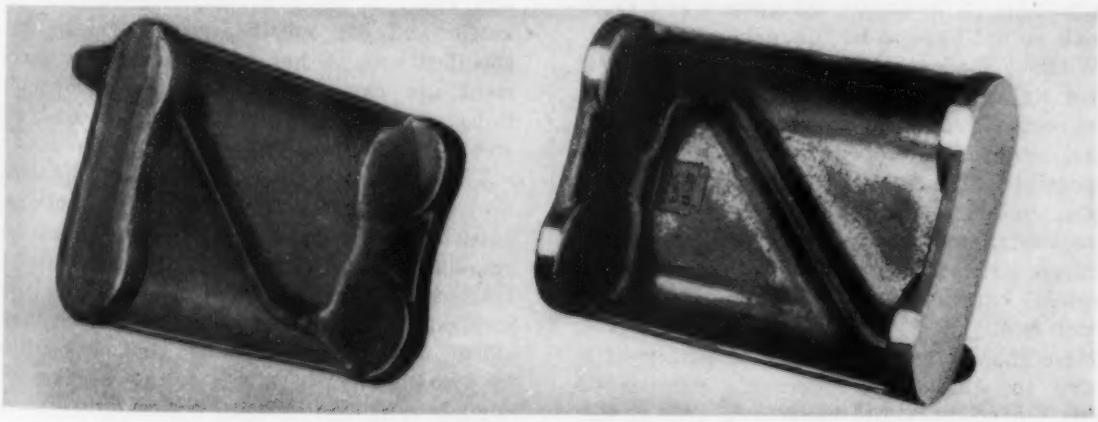
The parts are held in the fixture so that the broaches cut the long way of the face, thus permitting parrower broaches to be used. Tooling is identical on both rams of the machine so that two parts are produced for each machine cycle.

Following surface broaching, the bores in the webs are drilled, locating from the broached pads. The parts then go to the next machine. At this operation there are four broaches permitting the line-broaching of all the bores on the two parts simultaneously.

No difficulty is experienced in broaching the relatively thin flanges. Reason for this is the use of automatic spreaders which support the top flange from the lower flange during the broaching stroke, thus preventing collapse of the part under cutting load. The spreaders are in the form of spring-loaded wedges designed to compensate for varying amounts of stock on the inside faces of the forgings.

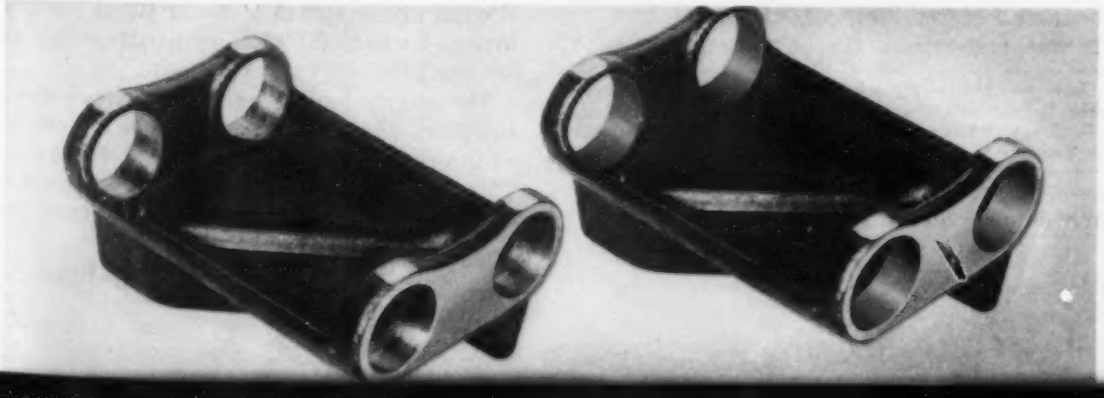
All clamping is hydraulic with electric interlock so that there is a minimum of responsibility on the part of the operator. The machine will not operate unless parts are properly clamped. The machine is provided with a follow rest support to guide the broach accurately during the broaching stroke. Broach handling is also automatic.

An interesting feature of the fixturing on both machines is that the fixtures will accommodate either right or left-hand parts interchangeably.



TANK PART as received, left, and as broached on first of two machines, right.

SECOND BROACH receives part as shown at left, finishes 4 bores on each of two parts, or 8 bores per setup.



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SAE CHARTS SIMPLIFY selection

By E. H. Stilwill,
Chairman
Iron & Steel Technical Committee
Society of Automotive Engineers

Selection of substitute steels has been simplified with new metallurgical tables prepared by the Iron & Steel Technical Committee of the Society of Automotive Engineers. Based on section size and quenching medium, the charts have been accepted by Ordnance for all products not specifically covered by other specifications.

For the first time, a metallurgist who knows the stresses present in a part can refer directly to a set of tables to determine which carbon or alloy steel will do the job he has in mind. New metallurgical tables take into account both section size and the quenching medium to be used. They also differentiate between highly stressed parts requiring nearly an all-martensitic structure on the quench and those which do not have to be "quenched out."

Without the experience and knowledge provided by many cooperating metallurgists who have made thousands of Jominy end-quench tests, such a development would have been impossible. The Society of Automotive Engineers, industry metallurgists and Ordnance have contributed to this accomplishment—the furthest advance yet made in applying metallurgical knowledge obtained from the end quench test.

More than a year ago, in anticipation of a period in which a considerable number of steels deviations would have to be considered, the Ordnance Dept. requested the Society of Automotive Engineers to appoint a group of metallurgists to review steel specifications prepared by Ordnance and purposely drawn to expedite alloy steel deviations.[1]

It was understood, the subcommittee's recommendations would not apply to aircraft and other defense items for which specifications have already been written. However, the new specifications could readily apply to many items being produced today by manufacturers of automobiles, trucks, tanks, machine tools, oil industry, farm and earth moving equipment and other products using large quantities of alloy constructional steels.

Standards have been accepted by Ordnance and apply to all products produced for Ordnance and not specifically covered by other specifications. Other branches of the government are expected to adopt these specifications at a later date. New carbon and alloy steels will be added as rapidly as accepted.

The advantages of having such specifications are apparent. If a deviation in a steel specification becomes necessary, a defense contractor or subcontractor has merely to advise his contracting officer that a change to some other steel on the list is being planned. The Ordnance officer, after checking his own list, may authorize the change in steels without delay. No further consultation with a metallurgist is required unless a question of heat treating practice, machining or a similar metallurgical problem arises.

The accompanying charts contain all SAE H band noncarburizing steels. Boron steels are included where satisfactory hardenability data are available.

The charts have been developed on the assumption that 80 pct martensite is required on the quench in Class A, highly stressed steels. This amount of martensite is readily attainable in commercial practice. Laboratory tests have

[1] Other members of the subcommittee were R. W. Roush, Timken Detroit Axle Co.; Joseph Gurski, Ford Motor Co.; A. F. Jones, Watertown Arsenal; George Kalon, Detroit Tank Arsenal; P. R. Wray, U. S. Steel Corp.

# of heat treatable steels

shown that fatigue properties will be reduced by not more than 10 pct by the presence of 20 pct or less of transformation products which form at a higher temperature than martensite.

In compiling these tables it was not possible to make allowances for design where notches are involved. It is well known that some steels exhibit high sensitivity to notches, particularly at low temperature.

Approval as an Ordnance specification was given in September 1951 (MIL-S-11415, Appendix A), about a year after the specification was originally submitted. In addition to Ordnance officers, a large group of metallurgists from the automotive and tractor industries has approved the specifications.

It should be emphasized that carburizing grades of steel are not included. Considerations involving response to the carburizing treatment — distortion, carbon gradient, retained austenite, carbon content of the case and other factors—make it impossible to include carburizing steels in the list.

When applying the charts to a specific metallurgical problem, the first thing to be considered is critical section size. Loads to be imposed on the part should, of course, be known. Keeping in mind the section size and type of quench to be used, it is then possible to select a block in which several steels are listed that fit these requirements. It may be desirable for the user to select alternate steels in the right block.

Several assumptions were made in setting up the tables. For example, it was assumed strength levels after tempering should fall within a range of 5 points RC. A yield-tensile ratio of approximately 90 pct was used in correlating yield strength and hardness. It was

TABLE I

STEELS FOR OIL QUENCH HIGHLY STRESSED PARTS

Yield Strength, PSI	Hardness After Temper Rc	Hardness After Quenching 80 Pct Martensite Minimum	Round Sections to ½ in.	Over ½ in. to 1 in.	Over 1 in. to 1½ in.	Over 1½ in. to 2 in.	Over 2 in. to 2¼ in.	Over 2¼ in. to 3 in.	Over 3 in. to 3¼ in.
			80 Pct Martensite—Full Radius to Center		½ Radius		¾ Radius		
			Reference Point 3½/16	6/16	7½/16	10/16	10½/16	13/16	15/16
90,000 to 125,000	23 to 30	42	1330H TS4130 3130H TS8632 5132H 50B30 8632H 80B30 4130H		8647H TS8647 80B45				
Over 125,000 to 150,000	30 to 36	44	1335H TS4132 2330H TS8635 3135H 50B35 4132H 80B35 5135H 8635H 9437H	3140H 50B40 4135H 80B40 8640H 81B35 8641H 8740H TS4135 TS8135 TS8640 TS8641	4137H TS4137 81B35	4142H TS4142 81B45		9840	4337H 9850 TS86B45
Over 150,000 to 170,000	36 to 41	48	1340H 9442H 2340H TS4135 3140H TS8145 4047H TS8637 4135H 14B50 5140H 50B40 8637H 9440H 8735H	4137H 80B45 8642H 81B35 8645H 8742H TS4137 TS8642 TS8645	4140H 8745H TS4140		4145H 9840 TS4145	4147H 4337H TS4147 81B45 TS86B45	4340H
Over 170,000 to 185,000	41 to 48	51	4053H 8740H 50B44 4063H 8742H 50B50 4140H 9260H 80B40 4640H 9445H 81B40 5145H TS4140 5150H TS8150 8640H TS8640 8641H TS8641 8642H TS8642	5147H 50B50 5160H 80B45 6150H 8647H 8745H 9262H TS8647	4142H TS4142 4145H TS4145 4337H TS8650 5152H TS8653 8650H 50B60 8655H 80B50 8747H 81B40 8750H 81B45 80B55	8660H TS8660 51B60 80B60	4147H 4340H 8653H TS4147 TS8653 81B45 TS86B45	4150H 9850 TS4150 81B50	
Over 185,000	46 min	55	4068H TS4150 50B60 4150H TS8160 81B50 5160H TS8165 8653H TS8653 8655H TS8655 9261H 9262H		8660H TS8660				

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TABLE II

STEELS FOR WATER QUENCH HIGHLY STRESSED PARTS

Yield Strength, PSI	Hardness After Temper Rc	Hardness After Quenching 80 Pct Martensite Minimum	Round Section to ½ in.	Over ½ in. to 1 in.	Over 1 in. to 1½ in.	Over 1½ in. to 2 in.	Over 2 in. to 2½ in.	Over 2½ in. to 3 in.	Over 3 in. to 3½ in.
			80 Pct Martensite—Full Radius to Center		½ Radius		¾ Radius		
			Reference Point 1½/16	3/16	4/16	6/16	5/16	6½/16	7½/16
90,000 to 125,000	23 to 30	42	4032	1330H 4130H 5130H 5132H 8630H TS4130 TS8630 14B35	2330H 3130H 4132H 8632H TS4132 TS8632 50B30 80B30				
Over 125,000 to 150,000	30 to 36	44	1330H 4130H 5130H 5132H 8630H TS4130 TS8630 14B35	2330H 50B30 3130H 80B30 4132H 5132H 8632H TS4132 TS8632			1340H TS8637 3135H 50B37 3140H 50B40 4640H 80B40 8637H 8735H	4135H TS4135	4137H TS4137 81B35
Over 150,000 to 170,000	36 to 41	48							
Over 170,000 to 185,000	41 to 46	51							
Over 185,000	46 min	55							

Note—Parts made of steel with a carbon content of 0.33 pct or higher should not be quenched in water without careful exploration for quench cracking.

TABLE III

STEELS FOR OIL QUENCH MODERATELY STRESSED PARTS

Yield Strength, PSI	Hardness After Temper Rc	Hardness After Quenching 50 Pct Martensite Minimum	Round Sections to ½ in.	Over ½ in. to 1 in.	Over 1 in. to 1½ in.	Over 1½ in. to 2 in.	Over 2 in. to 2½ in.	Over 2½ in. to 3 in.	Over 3 in. to 3½ in.
			50 Pct Martensite—Full Radius to Center		½ Radius		¾ Radius		
			Reference Point 3½/16	6/16	7½/16	10/16	10½/16	13/16	15/16
90,000 to 125,000	23 to 30	42	1330H TS4130 3130H TS8632 4130H 50B30 5132H 80B30 8632H	8637H TS8637 50B35 80B35	3140H 8740H	4140H TS4140 81B40			
Over 125,000 to 150,000	30 to 36	44	1335H TS4132 2330H TS8142 4132H TS8635 5135H 50B35 8835H 9437H 4042H	3140H TS4135 4135H TS8640 4640H TS8641 8640H 8641H 8740H	4137H 8642H 8645H 8742H 6150H TS4137 TS8642 TS8645 81B35	8747H 80B45	4142H TS4142 81B40	4145H TS4145	4337H 9850 TS86B45
Over 152,000 to 170,000	36 to 41	48	1340H 9440H 3135H 9442H 3140H TS4135 4047H TS8147 4135H TS8637 5140H 14B50 8637H 50B40 8735H 80B35 81B35	4137H TS4137 4140H TS4140 5150H TS8642 8642H TS8645 8645H 81B35 8742H 81B40	4142H 5147H 8647H 8745H TS4142 TS8647 50B50 80B45 81B40		4145H 8655H 8750H 9840 TS4145 TS8655 80B55	4147H 4337H TS4147 81B45 TS86B45	4340H
Over 170,000 to 185,000	41 to 46	51	4053H 8740H 50B44 4063H 8742H 50B50 4140H 9260H 80B40 4640H 9445H 81B40 5145H TS4140 81B50 5150H TS8150 8640H TS8640 8641H TS8641 8642H TS8642	4142H TS4142 4337H TS8647 5147H 50B50 6150H 80B45 8647H 81B40 8745H 9261H	4145H TS8655 5152H 50B60 5650H 80B50 8655H 80B55 8747H 81B45 8750H 9260H TS4145 TS8650		4147H 4340H 8653H 8660H 51B60 80B60 81B45 TS86B45	4150H 9850 TS4150 81B50	
Over 185,000	46 min	55	4068H TS8160 4150H TS8165 5160H TS8653 8653H TS8655 8655H 9261H 9262H TS4150	50B60	8660H 80B60 TS8660				

TABLE IV

STEELS FOR WATER QUENCH MODERATELY STRESSED PARTS

Yield Strength, PSI	Hardness After Temper Rc	Hardness After Quenching 50 Pct Martensite Minimum	Round Sections to ½ in.	Over ½ in. to 1 in.	Over 1 in. to 1½ in.	Over 1½ in. to 2 in.	Over 2 in. to 2½ in.	Over 2½ in. to 3 in.	Over 3 in. to 3½ in.
			50 Pct Martensite—Full Radius to Center		½ Radius		¾ Radius		
			Reference Point 1½/16	3/16	4/16	6/16	5/16	6½/16	7½/16
90,000 to 125,000	23 to 30	42	1040	1330H TS8137 4037H 14B35 4130H 5130H 5132H 8630H TS4130 TS8630	2330H 50B30 3130H 80B30 4132H 8632H 9437H TS4132 TS8632		1340H 50B35 3135H 80B35 4135H 81B35 8635H 8637H 9440H TS4135 TS8635 TS8637	4640H	3140H 8640H 8641H 8740H TS8640 TS8641 80B40 81B40
Over 125,000 to 150,000	30 to 36	44	1036 50B30 1045 80B30 1330H 4032H 4130H 8630H TS4130 TS8630	2330H 50B30 3130H 80B30 4132H 8632H 9437H TS4132 TS8632	1335H 5135H 8635H 9440H TS8635 50B35		1340H 8735H* 3135H* 9442H 3140H TS8168 4068H TS8637 4640H 5140H* 5145H 8637H*	4135H 80B40 5150H 81B35 8640H 8641H 8740H 9445H TS4135 TS8640 TS8641	4137H TS8645 4140H 50B40 6150H 80B40 8642H 81B40 8645H 8742H TS4137 TS4140 TS8642
Over 150,000 to 170,000	36 to 41	48	1335H 14B35 4037H 50B35 5135H 8635H 9437H TS8137 TS8635	3135H 4042H 9440H TS6142 50B40 80B40	1340H 50B37 4135H 50B40 5140H 80B35 8637H 81B35 8735H 9442H TS4135 TS8637		4137H TS4137 4640H* TS8640* 5145H* TS8641* 8640H* 50B40 8641H* 80B40 8740H 81B35 9445H*	4140H 80B45 6150H 81B40 8645H 8742H 9261H TS4140 TS8645 50B44	5147H 8647H 8745H 9262H TS8647 50B50 80B45
Over 170,000 to 185,000	41 to 46	51							
Over 185,000	46 min	55							

Note—* This steel has insufficient hardenability for the next lower critical section range because of different location of reference point.
Parts made of steel with a carbon content of 0.33 pct or higher should not be water quenched without careful exploration for quench cracking.

decided on a basis of experience that the as-quench hardness should be a minimum of eight points RC higher than the hardness after tempering.

Critical section sizes have been divided into increments of ½ in. up to 3½ in. The reference point for the critical section was at the center of the section up to 1 in. round. Half radius was used for sections over 1 to 2 in. and ¾ radius for sections over 2 in. These reference points were then correlated with distances from the end of the standard end-quenched Jominy bar having the same cooling rates.

The next step was to define the hardness in the as-quenched condition for 80 pct martensite. This was determined from the Hodge and Orehoski curves.[2] The minimum carbon content of the grade under consideration was used in selecting this hardness.

[2] J. M. Hodge and M. A. Orehoski "Relationship between Hardenability and Percentage of Martensite in Some Low Alloy Steels," Transactions *AIME* 167: 627 (1946).

Table I shows the grouping of available steels together for oil-quenched parts that will be highly stressed in service. Table II shows the grouping of steels for highly stressed water quenched parts.

Table III shows the steels together for oil quenched parts where only 50 pct martensite is required in the as-quenched condition. Table IV lists the steels which develop 50 pct martensite after water quenching.

Since steels containing 0.33 pct C or over are susceptible to cracking or excessive distortion on water quenching, such steels are not recommended for use where sections less than 2 in. in diam are involved.

To take a specific example, Table I shows that 4142 H falls in the group 170,000 to 185,000 psi yield strength for sections 1 to 1½ in. Using 0.40 pct C as the minimum, the Hodge and Orehoski curves show that the hardness for 80 pct martensite for a steel having this carbon content is RC 47. It had previously been determined that the minimum as-quenched hardness for this strength level should be RC 51. This occurs at 7½ sixteenths along the minimum hardenability H band. Therefore, 4142 H can be used in sections as large as 1½ in. oil-quenched requiring 185,000 psi max. y.s.

The same steel may also be used in sections up to 2 in. but requiring only 150,000 psi yield strength because 47 RC is at 10/16 for the minimum of the 4142 H band. Only 44 RC is the as-quenched requirement for this strength level. Any steel on the chart can be used at a lower strength level for any given section indicated on the chart. This same steel may also be specified for a smaller section size requiring the same strength level.

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COMPRESSED AIR, CARBON ARC speed metal cutting

A compact electric arc and compressed air gouging and cutting torch is being used in foundry cleaning rooms and to cut austenitic chrome-nickel weld metal at speeds comparable to the oxygen-acetylene torch and at a fraction of the cost.

The process uses the Arcair torch, which requires a ⅜ in. × 12 in. carbon electrode, an ordinary 300 to 400 amp dc welding machine and compressed air. Development work was done by National Supply Co.

The compact gouging and cutting torch is 10¼ in. overall. An air control valve and rotating nozzle permit changing the electrode angle to suit the job, while maintaining the jet in perfect alignment. No gas cylinders or regulators are necessary.

Air runs parallel to electrode

In the rotating nozzle which holds the electrode are two ⅛-in. holes. These holes are the outlet for the air. This enables the air to run parallel to the carbon electrode. The electrical lead and the compressed air are combined in one hose for easy handling. Air pressure is 80 to 90 lb, but is still effective at 60 lb.

The torch is most efficient in the foundry cleaning room. Ribs, fins and riser pads can be removed with ease. The continuous air flow results in a clean, smooth cut. The torch readily removes sand or dirt spots, is maneuverable, and can be used in confined places.

Shrinks under a riser are prepared for welding by the torch with less metal removed than results when chipping is employed. During defect removal by chipping, the deeper the hole, the greater the hole diameter becomes on the surface.

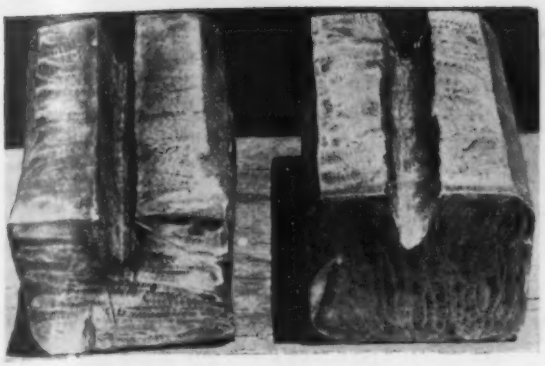
Naval armor is welded with austenitic chrome-nickel weld metal, which does not readily oxidize. Gouging or cutting with ordinary oxygen and acetylene methods is out of the question. Removal of such welds is slow and costly. Chipping is difficult because of the work hardening properties of the metal. In many cases it is necessary to drill adjoining holes and grind out intervening metal.

This led to melting it out of the weld with the arc. At first gravity was depended upon to remove the molten metal. Much work, however, was in the downhand position and could not be moved. Use of an intermittent air jet to blow out the molten metal was tried in 1941. A small puddle of metal was melted with the arc and then blown away with the air. Later it was found possible to maintain the arc in a continuous steam of air parallel to the plate. This made the process continuous and increased the speed but called for two men. One held the arc and the other the air nozzle.

Removes fillet weld easily

To reduce labor cost and speed the operation, a torch was designed to operate with the air parallel to the electrode.

The first combined air-arc torch removed 2400 ft of ⅜ in. austenitic fillet weld in 20 man-days. Removal by chipping would have taken at least 120 man-days and about 12,000 redressings of chisels. The torch has found wide use in structural fabrication, foundries and steel mills. Though designed originally for stainless steel, today 90 pct of the torches are used on mild steel competing with oxygen and acetylene, or mechanical methods.



ONLY 26 MINUTES were needed to cut groove 1⅞ in. wide x 2¼ in. deep across 8¼ in. face of this carbon steel block. Four chisels were used to chip out block at right.

COMPACT Arcair gouging and cutting torch is only 10¼ in. overall. Small holes visible in rotating nozzle permit air to escape parallel to ⅜ in. carbon electrode.

After cutting a 6 in.-round steel plate, ¾ in. thick with an Arcair Torch for one minute, a pyrometer recorded a temperature of 250°F. The same test, made with an oxygen gouging torch showed a temperature of 600°F.

A similar test with a 2-minute cutting interval, resulted in a temperature rise of 450°F against a temperature of 850° to 1000°F for the oxygen gouging torch.

Tests at National Supply Co. show a groove 3 ft long, ⅜ in. wide and ¼ in. deep can be cut in one minute with the air-arc torch. Many tests made between the air-arc and the gouging oxygen torch indicate practically no difference in speed between the two processes. Compared with chipping, definite time advantages are possible.

A steel block of 0.20-0.30 pct C, 7 in. x 8¼-in. x 7 in. was used in tests. A groove was cut 2¼ in. deep the entire length of the block. The torch cut a groove 17⅞ in. wide at the surface in 26 minutes.

The same test employing chipping resulted in a groove 2¼ in. wide at the surface. The extra width being needed to chip to the same depth as the torch had cut. Four chisels were used in this test and each was sharpened four times. The time saved with the torch amounted to 79 minutes or 75 pct.

A review of several tests indicates the torch process could remove 200 pct more metal than could be removed by chipping in the same time.

While the operator using the torch is subjected to some heat, elimination of the noise which goes with chipping makes his job more comfortable.

Economics in use of oxygen and acetylene are possible. The oxygen and acetylene consumed by a gouging torch in one hour, according to an oxygen manufacturer, are 960 cu ft of oxygen and 108 cu ft of acetylene. Costs for oxygen and acetylene, based on manufacturer's figures, would run about $6.59. The air-arc torch can be operated for about $1.07 an hour including the cost of electric-power for the welding machine.

NEW BOOKS

"Fundamentals of Supervision," by Charles F. Harad, presents in short, complete units the fundamentals of successful supervision. The supervisor learns about himself, his organization and his workers. The course, complete in itself, requires no additional references. Parts may be adapted to meet local training needs. Delmar Publishers, Inc., Albany 1, N. Y. $3.75. 224 p.

"Advantages of the Gray Iron Casting Process and Products," by C. O. Burgess, is the third of a series. It explains the advantages of gray iron as a casting material, its general availability and ultimate low cost. Gray Iron Founders' Society, Inc., 210 National City—East 6th Bldg., Cleveland 14. 28 p.

"The Non-Destructive Testing of Metals," by R. F. Hanstock, approaches the subject without limiting reference to any one type of testing such as radiography, magnetic or ultrasonic methods. While these are considered, other less known methods are described with the object of presenting alternative approaches to difficult problems. The Institute of Metals, 4 Grosvenor Gardens, London S.W. 1. $3.50. 163 p.

"Are You Afraid of Failure," by John L. Beckley, is an inspirational little pep-talk which, while it won't solve all your morale problems, will give many employees a real boost. The Economics Press, Montclair, N. J. Special rates on quantity orders. 12 p.

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TIN AND COPPER IN STEEL:

both are bad

together they're worse

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Dept. of Mines and Technical Surveys
Ottawa, Ont.

Tin build-up caused cracks in bend tests at 1825°F. An argon atmosphere prevents this—except when tin content is increased. A temperature of 2300°F also reduces cracking. Deeper surface breaks develop as copper is increased at a given tin level and as tin is increased at a given copper level.

Difficulties have often been encountered in the hot forming of steels due to surface checking and cracking. Investigation of surface checking and cracking in hot-formed steels has sometimes revealed high residual tin and copper contents. Although the effect of copper is fairly well known,[1, 2] very little work has been reported on the effects of tin. This is true both of tin by itself and in combination with copper. Using a simple bend test, the effects of small quantities of these metals on the hot working of steel have been investigated by the Mines Branch, Dept. of Mines and Technical Surveys, Ottawa, Ont.

Heats of steel were made in a 50-lb induction furnace using a charge of Armco iron. The steel was poured into small rectangular cast-iron ingot moulds having a cross-section 2½ x 5 in. and a 12-in. height. The ingots were heated to a temperature of 2000°F and rolled to a reduction of approximately 50 pct in cross-section (1¼ x 5 1/16 in.). The slabs were then annealed at 1650°F. The chemical analysis of the heats that were tested are given in Table I.

The rolled slabs were cropped. Slices were then cut from each end of the slab and deep etched for forty-five min in a 50 pct solution of hydrochloric acid at 165°F. This insured that sufficient cropping had been carried out and only sound metal would be tested.

Bend test bars, 3 x ½ x ¾ in., were machined from the slabs. These were bent over the ½-in.

TABLE I

CHEMISTRY OF STEELS TESTED

Heat No.	C	Mn	Si	S	P	Sn	Cu
1528	0.19	0.33	0.23	0.022	0.008	0.011	.....
1529	0.20	0.30	0.22	0.024	0.011	0.028	.....
1513	0.15	0.36	0.18	0.024	0.008	0.049	.....
1514	0.18	0.36	0.19	0.025	0.011	0.067	.....
1515	0.15	0.32	0.17	0.022	0.008	0.090	.....
1516	0.16	0.40	0.14	0.027	0.013	0.28	.....
1657	0.17	0.14	0.25	0.042	0.014	0.54	.....
1654	0.16	0.28	0.25	0.042	0.014	1.00	.....
1532	0.17	0.32	0.24	0.021	0.012	.....	0.18
1533	0.17	0.34	0.28	0.021	0.011	.....	0.28
1534	0.15	0.33	0.26	0.020	0.011	.....	0.48
1535	0.18	0.35	0.30	0.019	0.013	.....	0.71
1536	0.18	0.28	0.24	0.019	0.011	.....	0.95
1537	0.18	0.34	0.27	0 018	0.013	.....	1.44
1538	0.17	0.33	0.29	0.019	0.010	.....	2.29
1582	0.18	0.29	0.23	0.021	0.014	0.084	0.20
1583	0.15	0.30	0.24	0.020	0.013	0.086	0.26
1584	0.15	0.30	0.23	0.018	0.013	0.093	0.45
1585	0.16	0.37	0.25	0.017	0.012	0.096	0.68
1589	0.15	0.37	0.27	0.020	0.013	0.043	0.29
1589	0.14	0.36	0.47	0.020	0.012	0.065	0.30
1590	0.15	0.37	0.26	0.018	0.013	0.076	0.31
1591	0.17	0.37	0.27	0.017	0.013	0.103	0.29

TABLE II

EFFECT OF ARGON ATMOSPHERE

Heat No.	Sn, pct	Cu, pct	Results
1514	0.067	.....	Perfect surface.
1515	0.090	.....	Perfect surface.
1657	0.547	.....	Broke in two. Surface perfect otherwise.
1654	1.00	.....	
1584	0.090	0.45	Perfect surface.
1585	0.098	0.68	Perfect surface.
1590	0.076	0.30	Perfect surface.
1591	0.103	0.30	Perfect surface.

TABLE III

SURFACE TIN CONTENT AFTER OXIDATION*

Distance From Surface, In.	Tin, pct 2300 °F	Tin, pct 1825 °F	1825 °F — Scale Removed After 2 Hr
0.005	0.43	0.45	0.92
0.010	0.45	0.30	0.95
0.015	0.34	0.30	0.55

* Heat No. 1516, 0.28 pct tin.

face to give the most severe test. Since there is no standard equipment for high-temperature bend testing, the following procedure was employed. Two pieces of steel pipe were each forged at one end to give them the rectangular shape of the test bars. The edges were then reinforced with weld metal (mild steel rod, ⅛ in.). One pipe was fixed vertically with the rectangular end facing upward.

The bend test bar was taken out of the furnace and inserted into the rectangular end of the fixed pipe. The second steel pipe was then fitted over the other end of the test bar and brought down very quickly. The angle of bend obtained was at least 170°. The total time required to complete the bend test from the moment the piece was taken out of the furnace was less than 9 sec.

The elongation to fracture, as measured in a hot-tensile test, is a function of the steel composition. In the hot-bend tests the bar periphery is constant, hence the effect of elongation is eliminated as a test variable.

The bars were heated in an electric muffle furnace. In this way the pick-up of sulphur from sulfur-bearing fuels was avoided. Care was taken to place the bars in the same position in the furnace at all times. All the surfaces of the bars were exposed to the air. The top surface of the bars in the furnace was always the outside surface (stressed in tension) of the bend after the test.

Time-temperature curves from different heating temperatures were first obtained. Thus the actual temperature of the test bars could be known from the furnace temperature and time required for the test, Fig. 1.

After the bend test was performed, the depth of the cracks was measured. The bars were cut in two longitudinally. The halves were polished and the edges were examined under a microscope. The depth of the cracks was measured for a distance of 1 in. around the circumference, at the greatest curvature of the bar. The average depth of the cracks measured is used as a criterion of the ability of the steel to resist cracking during hot bending.

Different atmospheres tried

It was suspected that an oxidizing atmosphere was necessary to produce tin-skin. To ascertain the effects of the atmosphere, two experiments were made. The first one consisted of heating the bars for two hours at 1825°F in an argon atmosphere and making the bend test. Results are given in Table II. These show that surface checking will not occur in the absence of oxygen. Note that at 0.547 pct and at 1.00 pct tin the sample fractured completely, showing hot shortness but still no surface checking.

The second experiment consisted in heating three pieces of steel from heat No. 1516 containing 0.28 pct tin. Two were held at 1825°F and one at 2300°F for periods of 4 hr each. On one of the pieces heated at 1825°F, the scale was removed after 2 hr and a new scale allowed to form for the last 2 hr. The scale was then carefully removed from all three samples and mill-

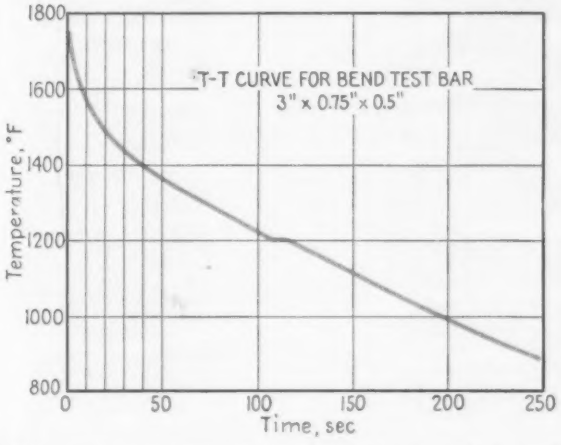

FIG. 1—A time-temperature curve typical of those used in hot bend tests of copper and tin-bearing steels.

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ings were taken from the bars every 0.005 in. for chemical analysis.

Results given in Table III show that the tin content is increased considerably on the surface of the samples after the treatment. The results would probably be still more striking if the millings had been taken every 0.001 in.

These two experiments show that oxidation is necessary to produce tin-skin. The rate of oxidation of iron is higher than the rate of loss of tin under these conditions. Removal of scale, allowing further oxidation to occur at the metal surface, produces a layer higher in tin.

The effects of increasing amounts of tin on surface cracking were tested at two different temperatures, 1825°F and 2300°F. The results are shown in Table IV and Fig. 2.

At 1825°F very faint traces of surface cracking were observed even in the heats containing the least amounts of tin. Between 0.28 and 0.54 pct tin, the steel became very hot, brittle and the samples broke in two.

The same tests were carried out, for comparative purposes, on heats of steel containing only copper. At 1825°F no surface cracking was observed on any of these samples. Heating to 2300°F, however, produced severe cracking on the bend test. A number of investigators[1,2] have explained this phenomenon. At 2300°F, copper which is not oxidized at the surface, is liquid. It penetrates into the grain boundaries of the steel, producing points of weakness, which fail under stress. The cracks extended down to approximately 5 mm on samples containing over 1.00 pct copper.

TABLE IV

EFFECT OF TIN ON DEPTH OF CRACKING

Heat Number	Tin, pct	Depth of Cracks — mm.	
		1825 °F	2300° F
1528	0.011	....	....
1529	0.028	....	....
1513	0.049	0.11	0.07
1514	0.067	0.12	0.08
1515	0.090	0.25	0.10
1516	0.280	0.32	0.13
1657	0.540	Broke	0.37
1654	1.000	Broke	Broke

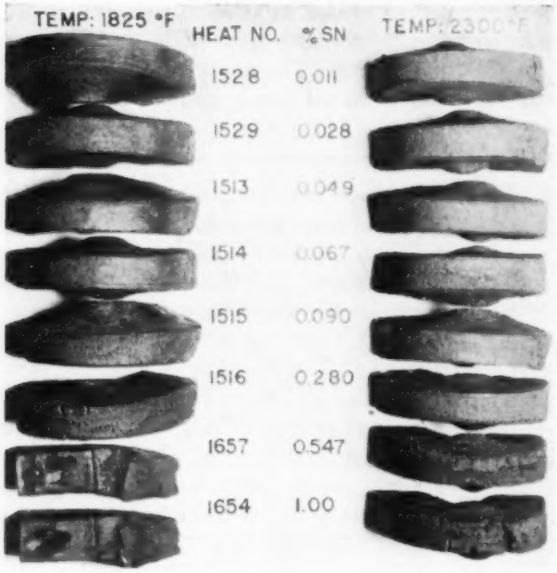

FIG. 2—Effects of increasing tin content on surface condition at two different temperatures.

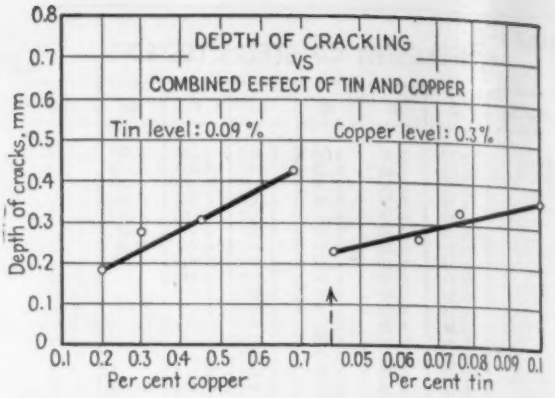

FIG. 3—How combined, increasing tin and copper content affect depth of surface cracks in steel.

The effects of tin and copper together were studied in bend tests made at 1825°F. Heats of steel containing increasing amounts of tin for a constant copper level, and increasing amounts of copper for a constant tin level, were used. The results are given in Table V and plotted in Fig. 3. Fig. 4 shows the surface appearance of the bend test specimens.

The depth of tin-skin was investigated as a function of time in the furnace. Test bars from heat 1515, containing 0.090 pct tin, were heated at 1825°F for different lengths of time and tested. Fig. 5 shows the increase in surface checking with time. Depth of crack measurements are given in Table VI.

These data are plotted and shown in Fig. 6. It can be seen that the depth of cracks increases with time, but the rate of increase is lower as the time is increased. This is probably due to the accumulating protective scale slowing down

TABLE V

EFFECT OF TIN AND COPPER TOGETHER

Heat Number	Composition, pct		Average Depth of Cracks, mm.	Depth of Deepest Cracks, mm.
	Tin	Copper		
1582	0.09	0.20	0.18	0.33
1583	0.09	0.30	0.25	0.41
1584	0.09	0.45	0.30	0.56
1585	0.09	0.68	0.43	2.80
1588	0.043	0.3	0.23	0.41
1589	0.065	0.3	0.25	0.41
1590	0.076	0.3	0.33	0.56
1591	0.103	0.3	0.36	0.76

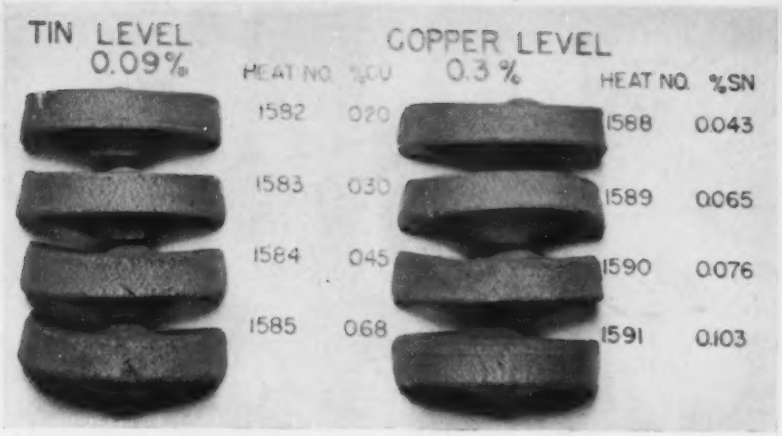

FIG. 4—Surface appearance of bend test specimens having increasing amounts of tin and copper content.

TABLE VI

DEPTH OF CRACKING V. TIME

Heat No. 1515, 0.090 pct tin

Time, hr	½	2	5	15	20
Depth of Cracks, mm.	0.11	0.24	0.30	0.42	0.46

changing rate of oxidation of iron on the surface.

The formation of a subscale was observed in all samples examined. The subscale contains the more oxidizable elements (aluminum, manganese, silicon) which have precipitated as oxide inclusions. The size of the oxide particles increase with temperature. Fig. 7 and 8 illustrate this very well. These pictures were taken of the samples from heat 1657 oxidized for two hours at 2300°F and 1825°F respectively. They show that the rate of subscale formation and the particle size definitely increase with temperature.

Fig. 9 unetched from heat 1516, shows how deeper cracks start from cracks in the brittle layer. This is important. It shows that fracture may possibly be due to tin-skin formation.

Formulating a description of the mechanism of surface checking in tin-containing steels, it appears the iron on the surface is oxidized in preference to tin. The tin content is consequently increased on the surface and starts diffusing inwards.

Surface cracks are deeper the higher the copper content at a given level, and the higher the tin content for a given copper level. However, the slope of the curve for copper (Fig. 3) is the greater. This indicates that the effect of copper is more drastic.

When both tin and copper are present, cracking may possibly be produced by the action of tin. Tin lowers the melting point of copper with consequent penetration of this alloy into the grain boundaries of the steel. Confirmatory microscopic evidence has not as yet been obtained to substantiate this theory.

The effect of sulfur was not investigated. It is known that roughening of the surface may sometimes be attributed to the pick-up of sulfur from sulfur-bearing fuels during heat treatment in industrial furnaces. This problem did not

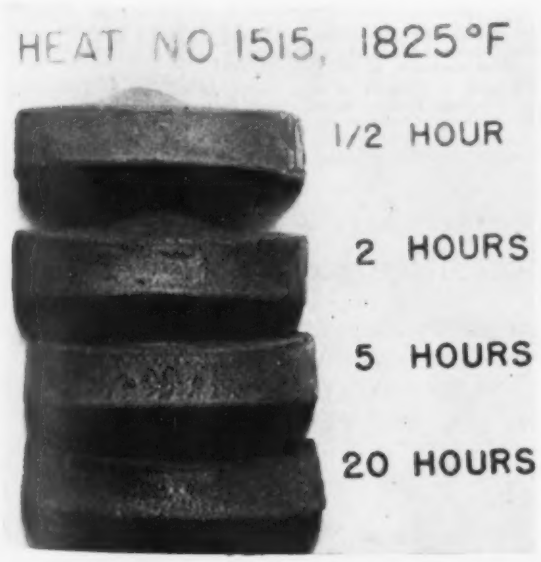

FIG. 5—Change in surface condition with time.

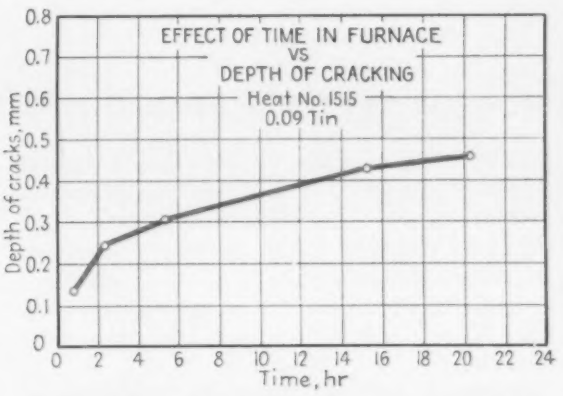

FIG. 6—How time affects depth of surface cracks.

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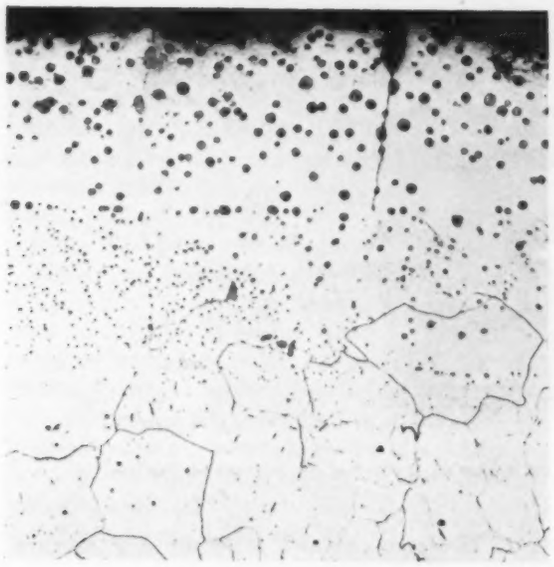

FIG. 7—Sample from heat 1657 oxidized for 2 hr at 2300°F, illustrating subscale. Nital etch, 300X.

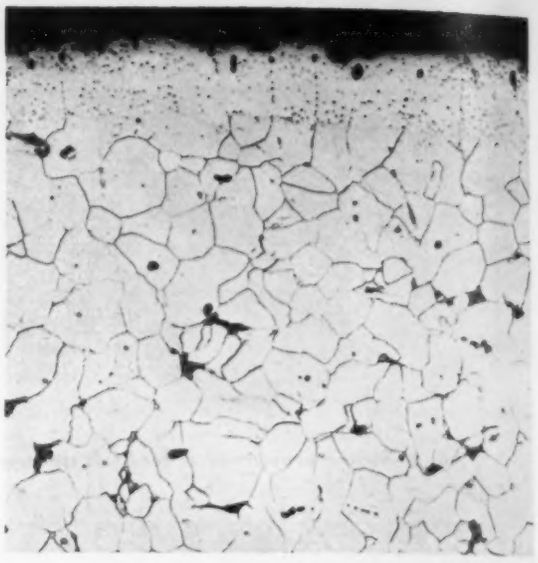

FIG. 8—Sample from heat 1657 oxidized for 2 hr at 1825°F, illustrating subscale. Nital etch, 300X.

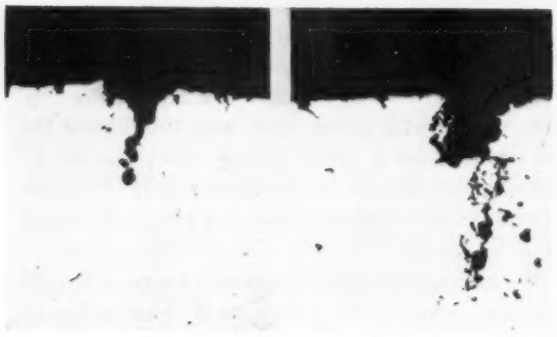

FIG. 9—This sample from heat 1516 shows how deeper cracks orginate from "tin-skin." Unetched, 5X.

Tin and copper in steel (continued)

arise here, since an electric furnace was used. However, a test was made to determine whether the sulfur content increases to any extent during oxidation. It was found that the sulfur in this case had increased from 0.015 to 0.036 pct.

As the sulfur was approximately the same in all heats used, it is assumed that the increase at the surface was relatively the same in all bars. The effects observed can be attributed directly to tin. It is known[3] that high sulfur in conjunction with tin and copper would be very detrimental.

An interesting point on the practical side is that oxygen causes tin content at the surface to increase markedly, particularly when scale is removed. It is obvious that a steel plate which has been rolled, then reheated and hot formed, may have a fairly high amount of tin on the surface. The more reheats in ordinary atmosphere, the higher the tin will be. Consequently, when the plate is severely worked during forming, especially at a low temperature, it would be more liable to crack.

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[1] Kodamas, S., "Influence of Copper on Mild Steel," Seitetsu Kenkyu, Journal Study Ferrous Metals, p. 1, Vol. 8, 1928. Abstract: Chemical Abstracts, p. 1092, Vol. 23, 1929.

[2] Kotaira, I., "Cause of the Thermal Brittleness of Cupriferous Steel," Seitetsu Kenkyu, Journal Study Ferrous Metals, p. 25, Vol. 8, 1928. Abstract: Chemical Abstracts, p. 1092, Vol. 23, 1929.

[3] Darken, L. S., "Diffusion in Metals Accompanied by Phase Changes," Transactions AIME, p. 157, Vol. 150, 1942.

Foreign crystals speed metal solidification

Foreign nuclei similar in structure to metal crystals are believed to induce solidification of metals in much the same manner as snow is formed by artificial cloud seeding techniques. This theory was presented by two General Electric scientists at a recent nucleation symposium of the American Metal Society at Northwestern University.

Cast metal such as aluminum, according to Dr. David Turnbull and famous weather researcher Dr. Bernard Vonnegut, contains tiny crystals of titanium carbide similar to the aluminum crystals. The titanium carbide crystals act in the same way as those of silver iodide used in cloud seeding to make snow. Crystals of the metal form about the titanium carbide crystals.

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Continued

Thermocouple glands

Conax thermocouple glands, described in a new bulletin, are designed for use with bare wire. More accurate temperature measurements of gases, vapors and liquids are possible. Talc is used as a sealant. The glands may be used at temperatures ranging to over 1500°F. Technical data on construction and design of the units are included. *Conax Corp.*

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Controls

Thermoswitch temperature controls are described in a new 52-p. catalog. Shown are variations on the basic Fenwal thermostatic device. Operating differential, sensitivity, temperature variation, and other problems connected with Thermoswitch use are discussed. Dimensional drawings and engineering data are included. *Fenwal Inc.*

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Photometer

Theory behind three important methods of analysis, colorimetry, fluorometry and nephelometry is described in a new bulletin. These three methods are available with one instrument involving a simple electronic-optical system. The Nefluoro-Photometer gives 60 second readings for a variety of organic and inorganic materials. *Fisher Scientific Co.*

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Magnets

A complete listing of stocked sizes and shapes of Carboloy Alnico permanent magnets is included in a new 20-p. bulletin. Pull curve and size information on both sintered and cast permanent magnets, as well as size and application data are included. Tables of properties and tolerances, ordering information and conversion tables are presented. *Carboloy Dept., General Electric Co.*

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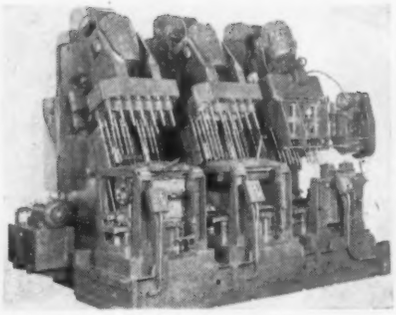

Machine handles four different cylinder blocks

Through fixture changes and interchanging of tools, four different cylinder blocks are handled on a manual transfer machine. It has three stations: drills, spotfaces and taps 11 jet holes; drills 7 oil holes from crank bore into oil gallery; and mills seven main bearing insert lock grooves. The machine consists of three angular columns, with No. 15 VS slide type drilling units at No. 1 and 2 stations, with 18-spindle drilling head at each station and No. 10 VS slide type unit at Station No. 3 with 11-spindle tapping head and 7-cutter milling unit. *LeMaire Tool & Mfg. Co.*

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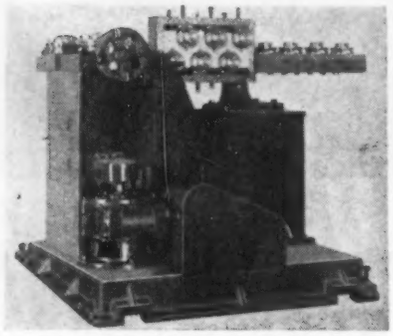

Feed starter straightens coiled rod ends

A new Shuster feed starter is for straightening and feeding the starting end of rod from coil. The operator positions the coil up to the feed starter, lets the power feed roll get a bite on the extreme starting end and the rod is automatically fed through the attached roll straightener, ready for the next production operation. When the straightened stock reaches the pulling device on the next machine the feed rolls are backed off, letting that machine pull the rod through the straightening rolls. Feed rolls have two grooves to accommodate different diameters of wire up to 5/8 in. Rate of feed is 68 ipm. *Mettler Machine Tool, Inc.*

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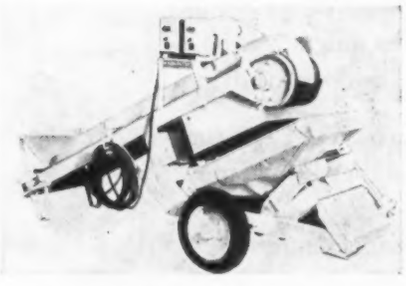

Floor sand preparation machine is portable

Magnetic separation and screening of sand for small and medium size foundries are provided by the Magnerator, a new portable sand conditioner. Perfectly balanced and with rubber-tired wheels, the machine is easily and quickly moved from foundry floor to floor. It is designed for shovel loading; is built in capacities of 20 and 30 tons of sand per hr. With it foundrymen can have screened, magnetically separated, full aerated sand whenever they wish. *Beardsley & Piper, Div. Pettibone Mulliken Corp.*

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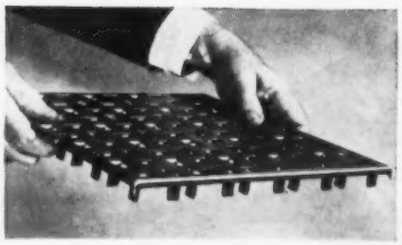

Steel plates reinforce concrete floor surfaces

An 11¾-in. square plate of 0.068-in. hot-rolled steel is designed for the reinforcement and protection of concrete floor surfaces that are constantly subjected to heavy industrial loads and severe punishment. Floor plate can be quickly installed as a new floor surface or over old floors. No special tools are necessary. Each plate contains 100 small rectangular holes and 100 barbed prongs. *Acme Steel Co.*

For more data insert No. 22 on postcard, p. 147.

Turn Page

for

BORON STEELS WITH FINE GRAIN SIZE

USE *Grainal* ALLOYS

Grain growth inhibitors in metallurgically determined amounts are included . . . in addition to boron . . . among the elements composing Grainal alloys.

Because of the beneficial influence of these additional elements, boron steels made with Grainal alloys maintain finer grain size at higher temperatures than is the case of boron steels made without inhibitors.

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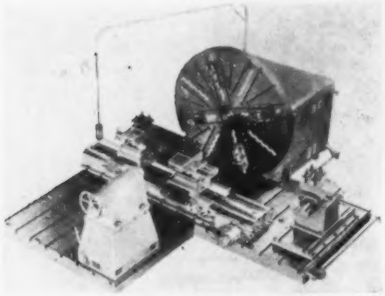
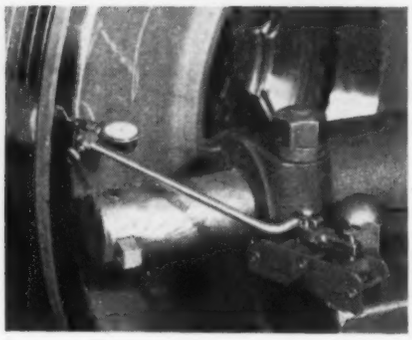


Sectionalized T-lathes adaptable to turning

These sectionalized T-lathes, manufactured by Heylingenstaedt & Co., Germany, are equally adaptable to turning or facing jobs, and to production-line work or the machining of single pieces. They feature synchronous motor feed, eliminating the need for mechanical feed transmissions which limit effective turning length. It also permits adjusting the cross bed and rear tool-post pedestal to any desired position on the baseplate. Four models have centers 37 to 47 in. high, with a max work diameter, 235 in. *Kurt Orban Co., Inc.*

For more data insert No. 23 on postcard, p. 147



Indicator holder has precision adjustment

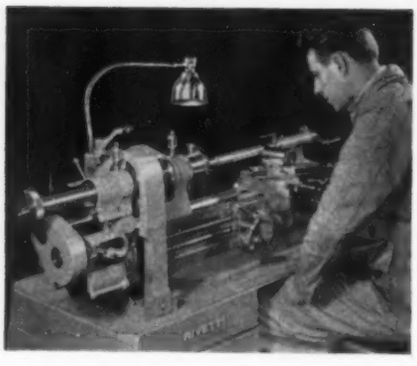
A new magnetic dial indicator holder features a precision adjusting device controlling the positioning of the dial holding rod. This eliminates possibility of the spring tension in the rod lifting the indicator off the work after the rod and indicator is placed by hand. Machinist swings the holding rod and indicator to within ½ in. or so of the work. Turning the thumb screw on the holder's magnetic base makes the most minute adjustment of the indicator against or away from the work without touching the rod or indicator. Holder has 45-50-lb magnetic pull. *Cullen Mfg. Co.*

For more data insert No. 24 on postcard, p. 147

Loader makes dump truck an all-purpose unit

Hykpa loader, which is adjustable to any size dump truck, consists of an attachable shovel or magnet, arms, and hydraulic equipment. Trucks equipped with this unit automatically become multi-purpose, all season machines since the Loader can be used as a hydraulic lift platform for loading drums, bales, crates, or shop-box containers with maximum speed and minimum effort. The Loader is mounted on the rear of the truck body and is operated by controls on the top of the truck cab or from auxiliary controls on the side of the truck. *Efficient Equipment, Inc.*

For more data insert No. 25 on postcard, p. 147



Instrument lathe features extreme accuracy

An 8½-in. swing lathe is guaranteed to turn or bore within 0.0001 in. in 6-in. work held in collet or between centers. A back-geared, screw cutting engine lathe, the Model 608, is recommended for a variety of work. Attachments are available for milling, spiral cutting, slotting, relieving, taper turning, radius turning, grinding and forming. Performance within the guaranteed limits is attained and safeguarded by a three point bed mounting, a double-bevel alignment for head and tailstock, a carriage bearing of 76 sq in. on the bed ways, and separate lead screw for thread cutting. *Rivett Lathe & Grinder, Inc.*

For more data insert No. 26 on postcard, p. 147

Piercing units incorporate stripping action

Based on new hydraulic power cylinder designs, portable piercing units incorporating automatic hydraulic stripping action are extremely compact and completely hydraulic in action. As an example of the combination light weight and high capacity achieved in these units, one of the models weighs 45 lb yet exerts a force of 5 tons at 2000 psi working pressure. Maximum capacity is 12½ tons at 5000 psi working pressure. Riveting, trimming, bending or extruding as well as piercing are possible with the tool. *Danly Machine Specialties, Inc.*

For more data insert No. 27 on postcard, p. 147

Turn Page

Five times former production!

That's what happens when Chuck-Matics replace hand machine methods for this High-Precision job

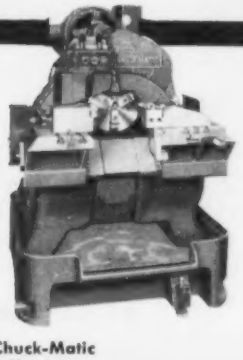
HERE'S THE STORY...

Most of the machines in this battery of Chuck-Matics were bought by one manufacturer, to do primary operation jobs—*and do them fast.* And, like many other jobs—such as bearing races, gear blanks and similar short-length parts—this customer's parts are rolling out in record time. The Chuck-Matic literally runs rings around ordinary hand-machine methods. Production increases of two to six times are the usual, rather than exceptional experience.

AND HERE'S THE JOB

PART	— Cast-Iron Cap
SIZE	— 6⅝" Diameter
OPERATIONS	— 5
TOOLS	— Carbide-tipped
MACHINE TIME	— 35 Seconds
PRODUCTION	— Five Times Former (Hand Machine) Method

—AND HERE'S THE MACHINE—



The 12" ACME-GRIDLEY Chuck-Matic Single-Spindle Chucking Machine.

- Removes metal as fast as carbide tools can take it.
- Versatile in operation; accommodates special machining requirements such as taper boring, internal recessing, relief facing and many other primary operations.
- Easy to set up, accessible for quick changes from job to job.
- Easy to operate; one operator can run as many machines as cycle time of jobs permit.
- Spacesaving; floor dimensions: 45" wide, 64" long.
- Rugged! Powerful! Meets high-precision standards on castings, forgings and tubing parts.

Ask for Bulletin SC-46

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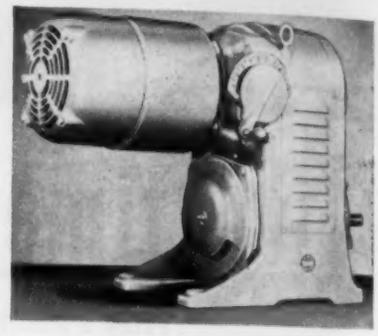
Resisting

There are Columbia warehouses and highly trained Columbia representatives in principal cities. For service, for quality, look to Columbia — producers of fine tool steel by the electric process.

COLUMBIA TOOL STEEL COMPANY
Main Office & Works—Chicago Heights 1, Ill.

Explosion-proof motor

In contrast to the conventional method of connecting an explosion-proof motor with a separate speed changer, a new explosion-proof Varidrive motor is self-contained, all mounted in one frame, occupying a single base. The motor element is totally-enclosed and air movement is blasted over the enclosed unit from the exterior by a spark-



proof fan housed within the end sector. This motor unit is mounted on the Varidrive assembly. By turning a control dial, change in speed is provided instantly. The motor is available in output speeds from 2 to 10,000 rpm in ratings from 1 to 20 hp. *U. S. Electrical Motors, Inc.*

For more data insert No. 28 on postcard, p. 147.

Patent abstracts

Photographic copies of patent abstracts as they appear weekly in the Official Patent Gazette are furnished by a new patent abstract service. Subscriber receives only class and sub-class or type of patents in which he is interested. Abstracts are reproduced full size on 4x6-in. cards, punched for instant sorting and filing. *Picturesort Co.*

For more data insert No. 29 on postcard, p. 147.

Voltmeter

An instrument that measures the radio-frequency voltage applied to the dielectric heating load gives a true indication of rate of heating-process performance. This radio-frequency voltmeter is entirely self-contained and requires no external power or batteries for operation. *Westinghouse Electric Corp.*

For more data insert No. 30 on postcard, p. 147.

Etch for aluminum

Controlled etching of aluminum and its alloys can be effected with a new compound that is claimed to eliminate the problems of foaming, sludging and hard scale formation. Production of a uniform controlled etch is by dipping or mechanical spray. Bath is easy to operate, easy to maintain and economical. *Silver Star Chemical Corp.*

For more data insert No. 31 on postcard, p. 147.

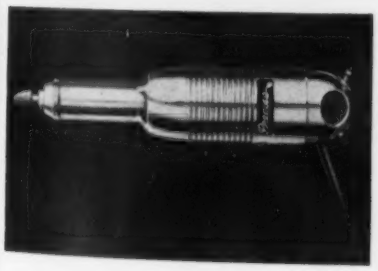
Plastic coated gloves

An improved plastic coating bonded to fabric work gloves provides lasting flexibility and improves gripping qualities. They are called Monkey-Grip because of this extra flexibility which is obtained by compounding the vinyl coating with special plasticizers. Gloves are said to be highly abrasion resistant; also resistant to oil and grease, acids and other chemicals. Knit-wrist, band-top and gauntlet styles are available, coated overall or palm and thumb. *Edmont Mfg. Co.*

For more data insert No. 32 on postcard, p. 147.

Grinder-miller

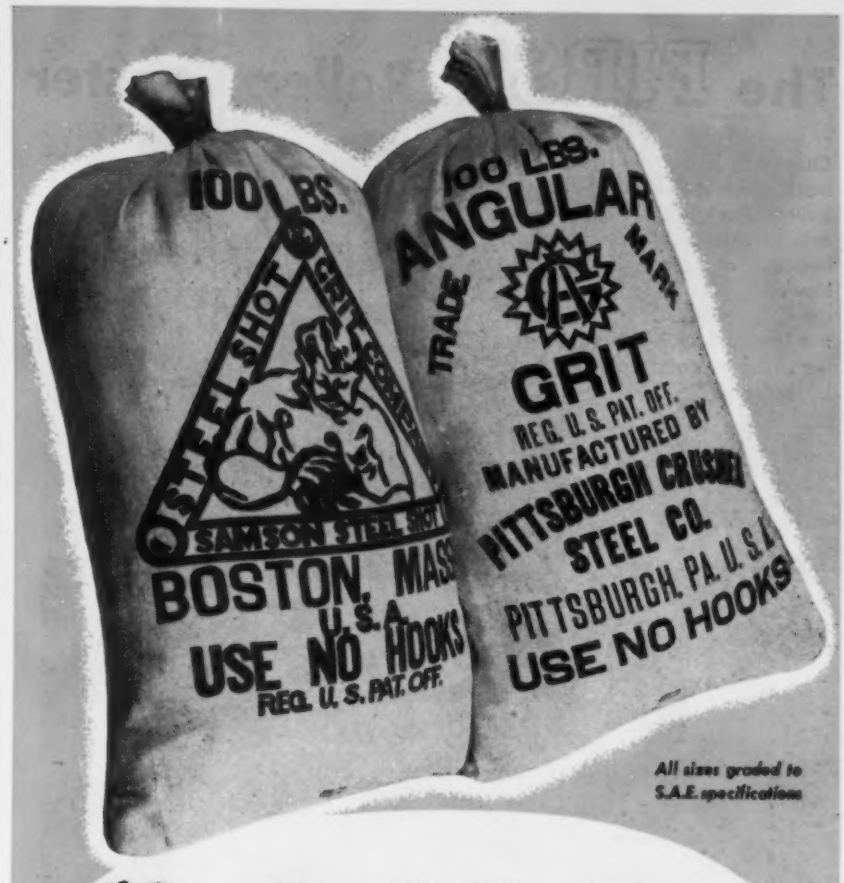
Super 40 is a multi-purpose, electrically powered grinder-miller. It is built for precision, high-speed applications when set up in Precise machine tool mounts on standard machine tools or when used as a portable handtool with or without



the attachable Coolflex flexible shaft. With accurate quill and collet chuck the grinder-miller turns at controllable speeds from 15,000 to 45,000 rpm. With its ¼ hp motor, it can be adapted to round-the-clock grinding, milling and finishing of small parts. *Precise Products Co.*

For more data insert No. 33 on postcard, p. 147.

Turn Page



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"Certified" Samson Shot and Angular Grit are made *extra-tough* by a special *automatically controlled* hardening process. They wear longer, can be used over and over again . . . actually clean more castings per dollar! Save money . . . switch to "Certified" Abrasives.

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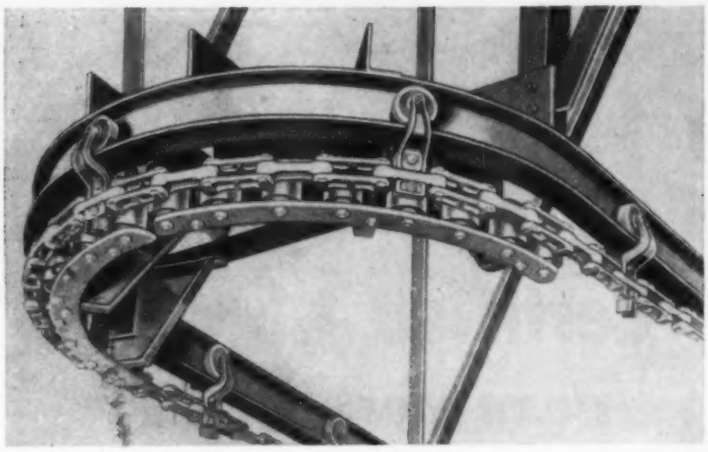
The FIRST Roller Coaster

Originally known as the Switchback, the first Roller Coaster was built in Paris in 1816. The crude originals were soon discontinued because of numerous fatalities. However, in 1880 they were again introduced in Paris and the United States simultaneously —and have since been enjoyed by millions.

JERVIS B. WEBB COMPANY was the FIRST to develop Horizontal Roller Curve Assemblies



Typical Webb Horizontal Roller Curve Assembly

The Webb Roller Curve is the most economical, serviceable and satisfactory unit for carrying an overhead conveyor chain around a horizontal curve. Chain and trolleys are held in the correct vertical position by ball bearing rollers which reduce both friction and wear to a minimum. Roller Curves are made in various radii and arcs for varying needs. Rollers are mounted between two segment bars.

The Working Part Of A Roller Curve Is The Roller

Rollers used in Webb Roller Curves are specially designed and built for the service. Available for two types of lubrication . . . oil hole in cover and grease fitting in drilled center pin. In either case, the Roller Curve is assembled so as to make lubrication easy. The design of the Roller Curve is such that the rollers are readily replaceable without dismantling.

CONVEYOR ENGINEERS AND MANUFACTURERS

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—New Equipment—

Continued

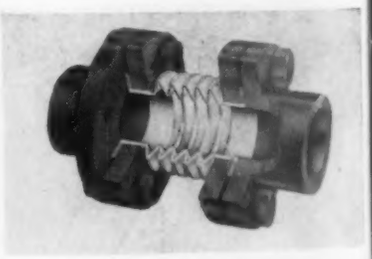
Non-toxic formula

Completion of a new, improved and non-toxic Dy-Chek formula for metal inspection has been announced. The Dy-Chek method of inspection is basically a hide-and-seek process. After pre-cleaning, a red dye is applied to the surface being inspected. After being left on long enough to hide in any flaw or defect—no matter how small—that extends to the surface, the die is removed. A white developer is then applied, seeking out the dye hidden in the flaw. As the developer dries, it pulls the hidden dye to the surface. The red dye thus bleeds in the white developer, marking with photographic clarity any defects, as well as their extent, that may be present. The inspection process is applicable to ferrous and nonferrous metals. It is applied by spraying, dipping or brushing. *Turco Products, Inc.*

For more data insert No. 34 on postcard, p. 147.

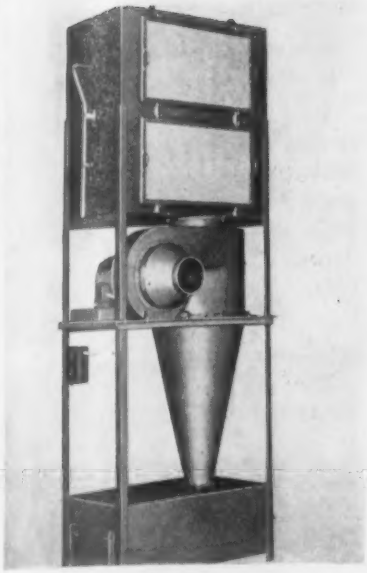
Bellows connector

Fabricated of chemically inert Teflon, a new bellows type connector has many pipe line applications where vibration, expansion and electrolysis exist in the handling of corrosive liquids or gases and solvents. The connecter is electrically non-conductive, flexible even at −94°F and as strong at 480°F



as at 70°F. The connector serves as a vibration dampener as well as an expansion joint—connects misaligned couplings and insulates flanges electrically. End flanges are French-type envelope gaskets made integral with the joint for easy assembly between companion flanges and a tight, leak-proof seal on installation. *Crane Packing Co.*

For more data insert No. 35 on postcard, p. 147.



Dust collector

Only 8 sq ft of floor space is required for a new industrial dust collector, which is capable of collecting the dust from 10 grinding wheels in simultaneous operation. Capacity is rated at 3630 cu ft of air per min at a static suction of 6 in. measured on an 8-in. inlet pipe. Dirt laden air is drawn into the machine by a self-clearing paddle wheel fan driven by a 5 hp motor. First stage cleaner is a cyclone separator; second stage cleaning is by compressed fiberglas filter which cleans the air and permits its return to the working space for a consequent saving of heat. *Aget-Detroit Co.*

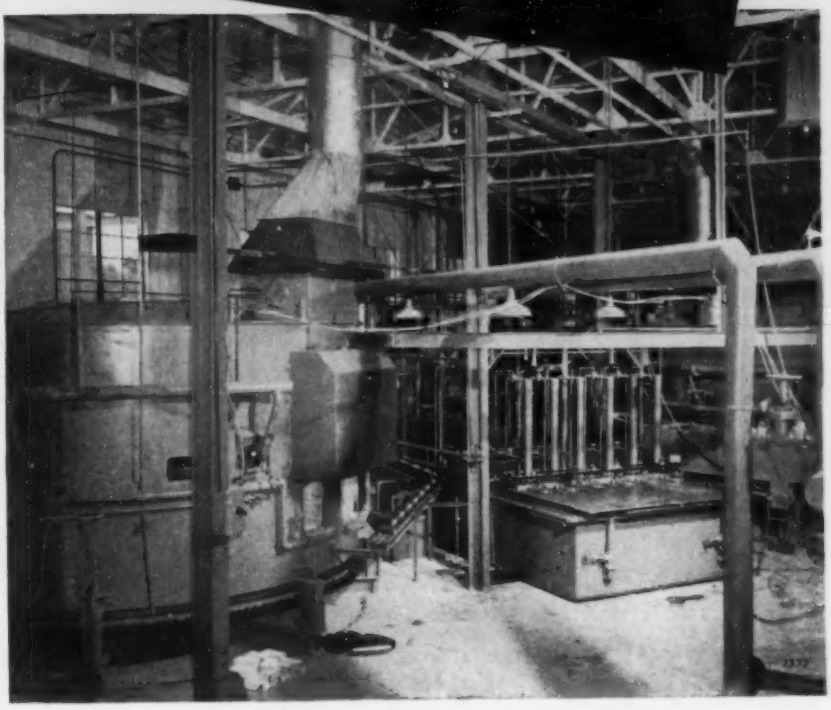
For more data insert No. 36 on postcard, p. 147.

Capnut

Known as the Caploc, a new capnut provides positive locking of the Security Locknut wherever acorn or capnuts must be used. It affords a protection against moisture and corrosive action that destroy bolt ends and make a nut non-removable. A heat-treated alloy spring steel insert within the cap acts purely as a locking device. The load is borne by the Caploc nut body. The insert is eliptical in shape. Locking power develops by the pressure exerted on the bolt by the narrow sides of the elipse. *Security Locknut Corp.*

For more data insert No. 37 on postcard, p. 147.

Accurate, Uniform Heating
WITH **GASMACO** FURNACES



In the production of 105 mm shells, accuracy and uniformity of heating are of vital importance. To obtain necessary tolerance, without the use of valuable alloys, two Gasmaco furnaces are employed — one for hardening and the other for drawing A quench tank is located between the furnaces on this operation, which requires the services of only two men

The shells are hardened, quenched and drawn in a vertical position to ensure positive uniformity and accuracy The result is better quality, faster production and lower cost.

For your heat treating problems and other furnace requirements, investigate the many advantages of Gasmaco. Call or write today.

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—Technical Briefs—

Ore Tests:

Reaction of new iron oxide ores in blast furnace quickly determined.

How an iron oxide ore will react in the blast furnace can be quickly determined by a fast, simple test recently perfected by the U. S. Bureau of Mines in experiments conducted at the University of Minnesota.

LOSS-IN-WEIGHT method provides quick, simple answer to how much oxygen is removed from iron-oxide during test. Method tells how ore will react in blast furnace.

The test is reported to have resulted in more efficient blast furnace operation, increased iron production and conserved coke. It also has saved making comparative tests to determine how untried iron oxide materials will reduce in the furnace.

The loss-in-weight test is conducted in an electrically-heated retort, suspended from a sensitive balance or scale used to determine the amount of oxygen removed from an iron oxide charge. It is considered an improvement over other methods because of the rapid direct weighing, done while the charge is in the retort. The test can be completed within a few hours.

Information obtained from the test enables industry to prepare iron oxide materials so as to get maximum iron production in the blast furnace.

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—Technical Briefs—

Metal Powders:

Processing dusts studied . . . Care needed to cut hazards.

Processing dusts from metal powders such as titanium, zirconium, thorium, uranium and their hydrides require special precautions to minimize explosion hazards, according to the U. S. Bureau of Mines.

Experiments showed the advisat various temperatures in air and other gaseous atmospheres was studied in cooperation with the Atomic Energy Commission. The report was prepared by Irving Hartmann, John Nagy and Murray Jacobsen.

Experiments showed the advisability of processing and storing many of these metallic powders—when dry—under helium or argon gas, as neither nitrogen nor carbon dioxide provides a safe atmosphere for them.

Dust clouds of these materials in air were found to be readily ignitable by weak electrical sparks, hot surfaces, open flames, and other common igniting sources. Five grams of uranium hydride placed on a watch glass at room temperature produced a few bright spots. Within a few minutes they "popped," producing a yellow flame over the surface, after which the entire mass assumed a dull-red glow.

When small quantities of zirconium, uranium and uranium hydride were dispersed in air at room temperature, they ignited spontaneously without any external source of ignition. Similarly, 3 grams of thorium hydride exposed at room temperature ignited within a few minutes.

Wherever possible, operations involving the more hazardous powders should be performed in atmospheres of helium or argon.

A copy of *"The Explosive Characteristics of Titanium, Zirconium, Thorium, Uranium and their Hydrides,"* may be obtained free from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

Turn to Page 162

"WHEN YOU MEN FIND OUT WHAT'S NEW AT THE PLASTICS SHOW I'M BETTING YOU'LL HAVE THIS THING LICKED"

Every facet of the vast plastics industry will be concentrated in Philadelphia's Convention Hall. You will see what's *new* in research, raw materials, machinery, and production techniques. If there's an answer to your problem in the plastics industry, you'll find it at the Exposition. *This exposition is not open to the public. Requests for admission tickets should be written on your company letterhead directed to* THE SOCIETY OF THE PLASTICS INDUSTRY, Inc., 67 W. 44th Street, New York 18, N.Y.

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MARCH 11 - 14 , 1952

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Give you these features

Double-acting spring cushioned draw bar to minimize stopping and starting shock, positive trail at high speeds, maximum roadability on rough terrain, sturdy solid steel axle beam construction . . . these features combine to make CARAVAN units outstanding among axle assemblies.

In addition, CARAVAN axles are noted for versatility. They are suitable for use on all types of industrial, field-service, construction and military equipment . . . wherever dependable portability is needed.

Both single axle (2-wheel) assemblies and 4-wheel running gear equipped with automotive type steering are available to meet a wide range of requirements. Units of either straight or drop type construction can be supplied.

Write today for United's 12-page illustrated Catalog No. 101. In addition to specifications on the complete line of CARAVAN axles, it contains descriptions of automatic surge-control braking device, retractable third-wheel assembly and other CARAVAN accessories.

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BURNISHING MATERIALS & BARRELS

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THE ABBOTT BALL COMPANY

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ABBOTT

Technical Briefs

Derusting:

Steel, cast iron may be cleaned, derusted with alkaline process.

High carbon steels prone to discolor even in inhibited acids can be rapidly derusted without tarnish or attack with a recently developed alkaline derusting process.

The derusting process, developed for steel, cast iron, malleable iron and other iron alloys, cleans and derusts at the same time. The process was developed by Enthone, Inc., of New Haven, Conn. The solution can be operated in a steel tank at room temperature.

Work to be derusted is made the cathode in a derusting solution for a few seconds to several minutes depending on surface condition.

Tests comparing the speed of derusting with hot sulphuric or cold hydrochloric acids have shown that derusting can be accomplished in a fraction of the time.

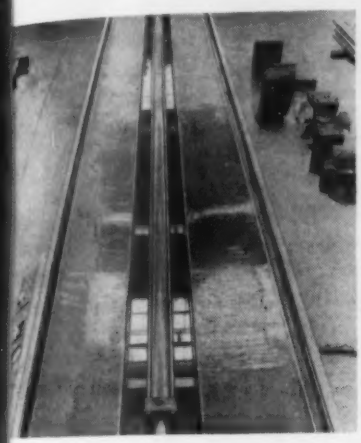
In one test, complete rust and scale removal was accomplished in 2 min as against 45 min for acid pickling. This is important where high speed pickling of wire or strip must be accomplished.

Large objects formerly thought to be unusable because of heavy accumulation of rust can now be reclaimed.

"Just familiarizing myself with that beautiful shape —er, sir."

Big Cylinder Has 24-Ft Piston

A 22-ft stroke hydraulic cylinder that features a 24-ft solid steel piston rod that does not sag under its own weight has been developed for air and hydraulic cylinder applications by Miller Motor Co., Melrose Park, Ill.



HYDRAULIC CYLINDER developed by Miller Motor Co. has 22-ft stroke and a 24-ft solid steel piston rod. Equipment is used on automatic cylinder honing machine.

The 24-ft piston rod is 2½ in. in diam and is hard chrome plated to resist nicks and scoring.

Construction and operation of the cylinder has made it possible for Planet Products Co. of Cincinnati to build a more efficient and completely automatic cylinder-operated honing machine. The machine hones air and hydraulic cylinder tubing to a 15 micro inch finish in up to 22-ft lengths and up to 20 in. bores. The Miller 22-ft stroke cylinder is used on this machine to operate the honing machine carriage continuously back and forth at 120 feet per minute.

Plating:

Machine parts rebuilt with process . . . Electrolytic iron used.

Renewal of worn surfaces of machine parts by plating is possible with a recently developed bath and an electrolytic iron, Vanderloy M.

Microscopically this electrolytic iron develops a fines, columnar structure with close packed, columnar grain perpendicular to the surface with which it is bonded.

Turn to Page 164

NO GAME OF CHANCE . . .

Getting the best from presses is an operator's stock in trade in the contract stamping business. Competition is keen, and successful old timers, like Briskin Mfg. Co., Chicago, didn't get that way without a great deal of production skill.

Briskin put their money on Clearing presses because Clearings gave them the maximum quality, economy, on-schedule production and minimum waste that are the watchwords of Briskin production. Die regrinds are few and far between and maintenance costs are lower, too.

Where competition is tough and economical production means a winning hand, Clearing presses are dependable assets. Looking at results is a good way to choose *your* press equipment too! For production, your best choice is Clearing.

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CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

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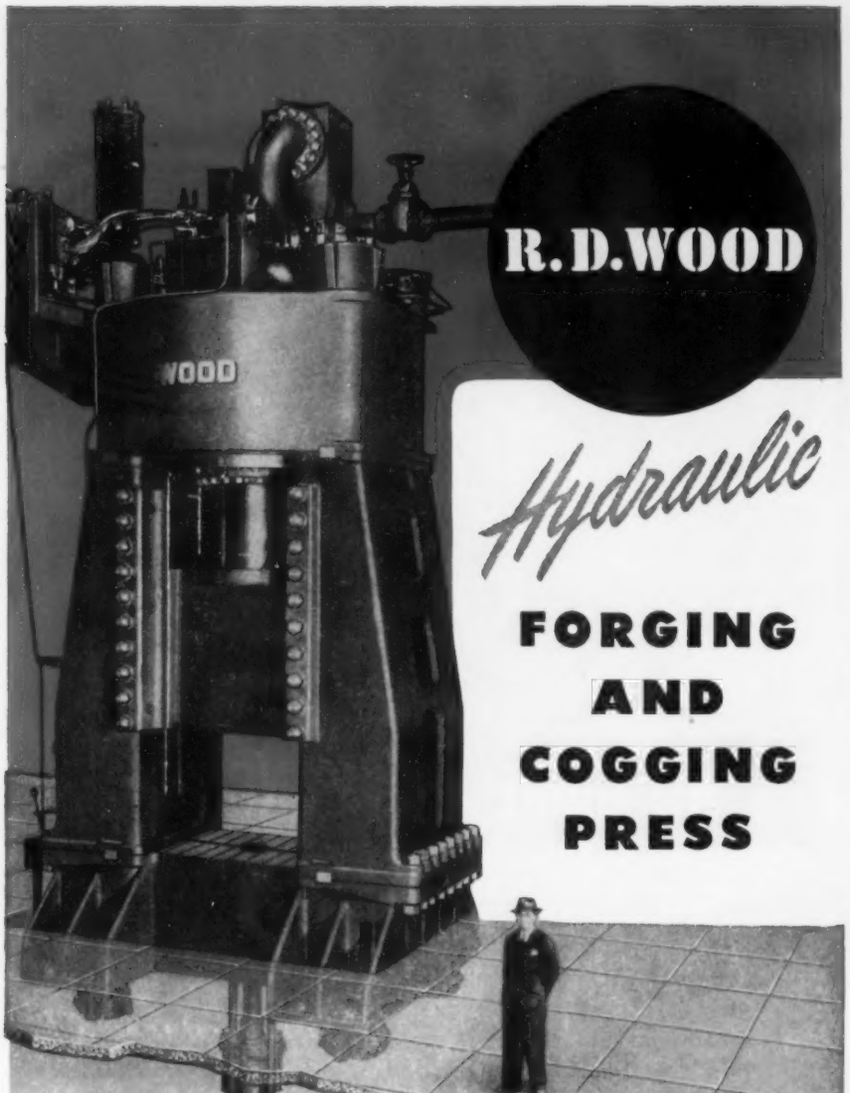

This big hydraulic press is designed and built for continuous heavy duty operation at high speeds. In die forging and ingot cogging, in addition to general press service of forming, forcing, upsetting and impact extrusion of all metals, this press is virtually unaffected by fatigue of impact shock, hydraulic surges, rapid stress reversals and similar factors. Supplied in 1500 and 3000 ton capacities, the press is down-working, and accumulator operated.

Press control is accomplished by a patented R. D. Wood system, permitting a sensitivity of operation heretofore unattainable. Pressure and speed are perfectly controlled; instantaneous stopping or reversal of the stroke is possible at any point. Write for complete information.

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EST. 1803

R.D. Wood Company

PUBLIC LEDGER BUILDING, PHILA. 5, PA.

—Technical Briefs—

Bath and iron were developed by the Van der Horst Laboratories.

The bond, established atomically between Vanderloy M and the base metal of parts plated, is indestructible. Application of enough force to tear one of the metals apart fails to disrupt its atomic adhesion to the other.

While the Vanderloy M now in production is practically pure-electrolytic iron, it is believed the bath can be adapted to alloy plating.

The bath used is well suited for plating heavy deposits. As deposits build up to substantial thickness, there is neither excessive grain growth nor roughness.

Deposits can be made of ¼ in. radial thickness, or more. The limit of thickness is determined by economics and design, rather than by the plating bath.

The moderately acidic bath remains stable and operates within practical limits of current density and working temperature.

The low temperature bath permits masking or stopping-off with wax. The bath is a true solution and lends itself either to continuous or periodic filtration.

Preparation consists of the usual degreasing, anodic alkaline cleaning, stopping-off of areas not to be plated, and, just prior to plating, anodic etching in a sulphuric bath.

On parts subjected to stress, such as crankshafts, a heat treatment of several hours at 600°F effectively drives off occluded hydrogen.

Quick Repairs Cut Conveyer Costs, Extend Belt Service Life

Maximum service life from conveyer belting requires quick repair of all belt damage as soon as discovered.

Belt fabric exposed to weather will absorb moisture if the protective cover becomes damaged, and may even become soaked. In warm weather, this leads to mildew and rot; in winter, ice crystals may gnaw at the fabric from within as the belt flexes, according to a report by the Thermoid Co.

A Statement by Anaconda on the Copper Situation

MANY users of copper have vital decisions to make . . . usually in connection with the present defense-induced shortages of copper and aluminum. This statement is an effort to remove the smoke screen surrounding the copper picture . . . to wipe away the confusion caused by too much talk supported by too few facts.

Substitution poses problems – Industry has been urged to substitute aluminum and other materials for copper. In some instances this may be logical and practicable. In many others it is difficult, if not impossible. But – before making *any* long-term decisions that may cost a great deal of money in engineering, new plant facilities or rescheduling of production operations – one should know the facts about the future of copper.

New Anaconda projects – The first major increase in copper production will come from Anaconda when the Greater Butte Project and the new Sulphide Plant at Chuquicamata, Chile, begin operations this spring. By 1953, these two projects should raise present levels of copper production by about 95,000 tons yearly.

Toward the close of 1953, Anaconda's new Yerington project in Nevada is expected to start producing at an annual rate of 30,000 tons. By then, Anaconda will be adding to the present yearly copper supply at the rate of about 125,000 tons.

Other new projects – During 1954-55 still other new projects in the U. S. and friendly foreign countries will further augment the increasing copper supply. All told, it is estimated that by 1955, not less than 450,000 tons of copper could be produced annually – over and above present production levels.

Accordingly, in 1955-56, domestic production plus imports could bring the U. S. copper supply to 1,800,000 tons yearly. This would represent an increase of about 20% over present levels. Based on historical comparisons, and barring a large-scale shooting war, this amount of copper could support a Federal Reserve Board Index of Industrial Production of 270, an increase of 24% over the present, and 45% above the first half of 1950.

• • •

These are the 'things to come' in copper. On the basis of the facts there is no necessity for considering long-range substitution of other materials for the red metal.

52320A

ANACONDA
COPPER MINING COMPANY

The American Brass Company
Anaconda Wire & Cable Company
International Smelting and Refining Company
Andes Copper Mining Company
Chile Copper Company
Greene Cananea Copper Company

PRODUCERS OF: Copper, Zinc, Lead, Silver, Gold, Cadmium, Vanadium, Superphosphate, Manganese Ore, Ferromanganese.

MANUFACTURERS OF: Electrical Wires and Cables, Copper, Brass, Bronze and other Copper Alloys in such forms as Sheet, Plate, Tube, Pipe, Rod, Wire, Forgings, Stampings, Extrusions, Flexible Metal Hose and Tubing.

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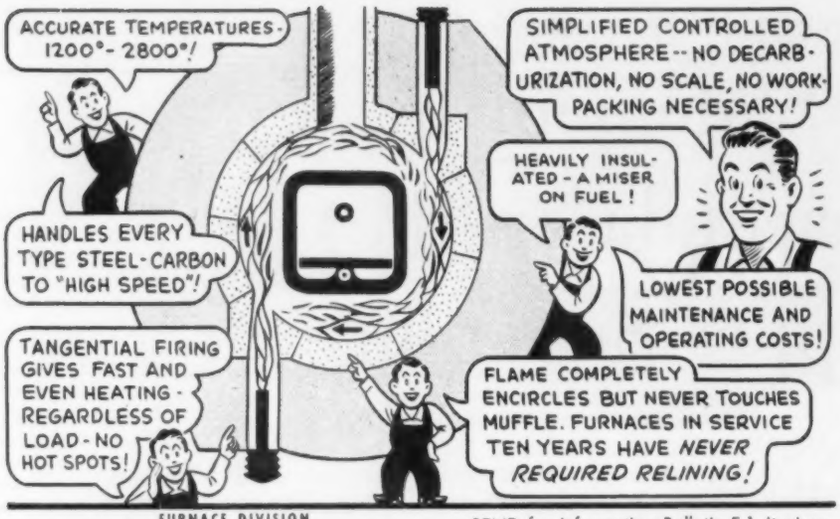
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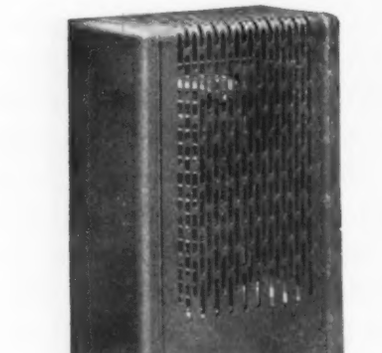

Why not use Perforated Metal?

This Wesix Electric Heater shows a typical application of Hendrick Perforated Metal, combining utility and attractiveness. The heater guard is 20 gauge steel, with 3/16" x 1½" side stagger perforations.

With facilities for producing any required shape and size of perforations in any commercially rolled metal, Hendrick invites inquiries from manufacturers who may be considering the use of perforated metal in connection with any of their products.

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Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

—Technical Briefs—

Stripping Oil:

Enamel adheres better, costs cut with improved stripping medium.

A new oil stripping medium offers important economies and improved results in the hot dip tin and terneplating industries. The new composition overcomes the most serious objections to palm oil and other traditional stripping oils.

Under the high temperatures at which oil stripping is commonly done, palm oil gradually decomposes and increases in body and viscosity. It generally becomes necessary to replace at least 25 pct of the oil every 2 weeks.

The new material, after a continuous 6 month's test, retained original properties. No additions were necessary except to replace the oil carried away as film on the finished product. The stripping oil was developed by Archer-Daniels-Midland.

Tinplate made with the new stripping medium has shown better enamel adhesion than obtained with the use of palm oil or other fatty triglycerides commonly used.

Bauxite:

Arkansas high-iron bauxite ores usable with new recovery method...

A new process for beneficiating Arkansas bauxite ores of high iron content—ores now unused for commercial production of abrasives or alumina—is described in a recent Bureau of Mines report.

Tests have shown an overall recovery of about 98 pct of the alumina content.

An abrasive fraction and a high-iron fraction which can be used for alumina production are produced. The method consists of a 10 to 15 minute low-temperature oxidation roasting of the ore, followed by a high-intensity magnetic separation of a high-iron fraction.

Written by W. A. Calhoun, H. E. Powell, and J. F. Hodshire, copies of the report, *"Beneficiation of High-Iron Arkansas Bauxite Ore,"* may be obtained from the Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.

Strike, Scrap Overshadow Record Output

First quarter output may hit 27.3 million net tons . . . But strike or bad weather could knock estimates . . . Decontrol pressure grows stronger . . . Easing trend continues.

Labor trouble and scrap shortages are overshadowing a remarkable production record in the steel industry. Barring enforced shutdowns from these causes, record smashing steel production during the first quarter will be close to 27.3 million net tons of ingots.

During the same period last year the industry poured 25.7 million net tons. Thus, the extra million tons of first quarter steel production requested several months ago by National Production Authority may be exceeded by more than half a million tons.

Why More Steel? — Here are some of the reasons output seems likely to beat the NPA goal: (1) New capacity is being brought into production at a rate of almost a million tons a month. (2) The scrap industry has done a fine job of keeping metal flowing to mills, with an assist from allocation. (3) Leap year means an additional day of production in February.

In estimating first quarter output, March is the pivotal month. This could easily prove to be the most critical month the steel industry will face this year. Historically a month of peak steel production March this year will likely be either a period of record breaking output or frustrating mill shutdowns. It all depends on what happens in scrap and labor, and March should tell the tale on both.

Ides of March — Strangely enough, the steel industry isn't in much of a position to do anything about either. Scrap supplies, which are still touch and go, with average inventory tending down, depend on the weather. Another icy blast from King Winter could still tip the balance. Solution of the wage-price impasse is still locked in the White House, and the Feb. 24 strike deadline is getting uncomfortably close. But, if the mills are running at a high rate in March. it will probably be a banner year for steel production.

Even though a steel strike would knock all production estimates into a cocked hat, consumers are not reacting to the threat as they usually do. Normally, even a mild threat of strike throws the steel market into a tizzy. As a hedge against the threat, frenzied consumers have been known to throw every conceivable type of pressure on the mills to hasten delivery. That isn't happening.

Where There's Smoke — The steel market, continuing its easing trend, is becoming almost orderly. This isn't as good as it sounds; to some small companies it spells real hardship. It means open space on the order books, unemployed facilities and sinking profits. Some small, nonintegrated mills are now working only 4 to 5 days a week because of lack of orders.

This is adding more fuel to the fires of decontrol; the pressure is becoming very strong. Some observers believe some sort of temporary decontrol on certain steel products could be worked out, despite NPA inertia. It has been suggested that a moratorium on controls over certain easy steel items could be placed in effect until such time as demand for these items grows tighter. This suggestion is aimed at overcoming NPA's reluctance to decontrol anything that might become tighter at some later date. But some steel people insist that, unless controls are relaxed on more products, small companies are going to be hurt by the unrealistic position of NPA.

Supporters — The small companies argue that they could fill their order books on easier products such as wire, sheets and strip, and mechanical tubing if their customers were permitted to use them. Their arguments are strengthened by their customers who complain about being cutback in civilian lines without compensating defense business. Both insist there could be some relaxing without hurting the defense effort.

Industry sources express fear that the structural jam will crack much faster than the government anticipates. This is based on the belief that there will be considerable time-lag in getting mothballed construction jobs underway after they get the green light. First easing is noted in angles, rounds, and flat bars. Beams and channels are wedged tight.

Some Luck — Government "suasion" to boost plate production is having some success, though additional output is not of the type most urgently needed. Generally, light or narrow plate is turning easier, but heavy plate stays tight.

The steel wage hearings, which were recessed Monday and Tuesday of this week, are scheduled to resume on Wednesday. The companies hope to finish presentation of their case on Thursday. Union rebuttal is tentatively scheduled for Friday and Saturday. It is hoped the hearings can be concluded this week. Recommendations of the panel are not binding.

Steelmaking operations this week are scheduled at 100 pct of rated capacity, down half a point from the previous week.

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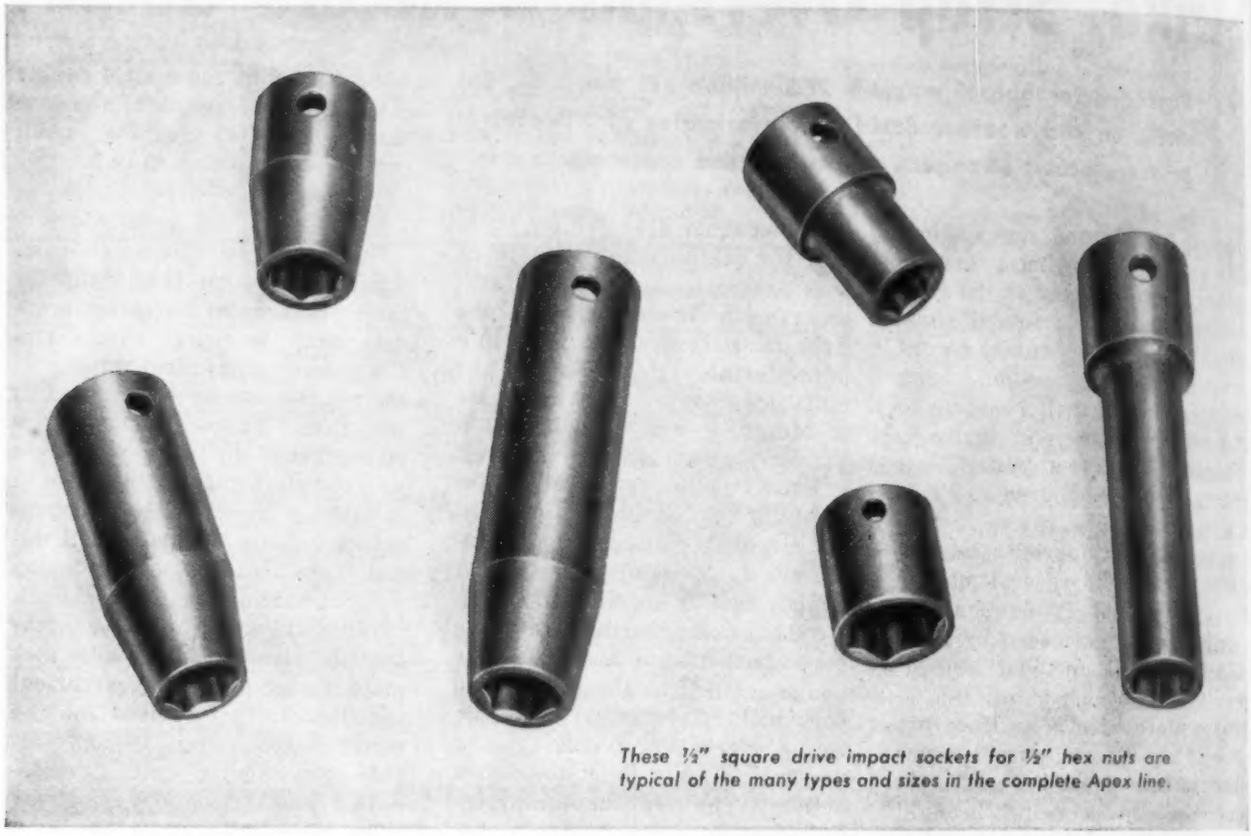
Ask APEX— FOR SQUARE DRIVE *impact sockets*



These ½" square drive impact sockets for ½" hex nuts are typical of the many types and sizes in the complete Apex line.

SQUARE DRIVES: 1/4" 9/32" 3/8" 1/2" 5/8" 3/4" 1" 1-1/2" 2-1/2"

BROACHED OPENINGS: for HEX nuts 3/16" to 5", for SQUARE nuts 1/4" to 2"

Apex offers a complete range of impact sockets for your nut setting operations . . . short, standard, long and extra-long lengths . . . standard and thin wall . . . magnetic types for hex head sheet metal screws.

Apex impact sockets, expressly designed for continuous, heavy-duty service, provide greater freedom from quick wear-out and tool breakage, help increase productive output and reduce your tool costs.

Catalog 29 lists thousands of stock items—write, on your company letterhead please, for your copy of this comprehensive catalog. For special applications, enclose sketch or blueprint—we'll quote promptly.

APEX TOOLS sockets, extensions, adapters

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POWER BITS, INSERT BITS AND BIT HOLDERS, FOR PHILLIPS, FREARSON (Reed & Prince), SLOTTED, CLUTCH HEAD and SOCKET HEAD SCREWS • HAND DRIVERS FOR PHILLIPS, FREARSON AND CLUTCH HEAD SCREWS • TWO-PIECE DRIVERS FOR HEX HEAD SCREWS • SOCKETS, EXTENSIONS, ADAPTERS AND NUT SETTERS • UNIVERSAL SOCKETS, EXTENSION WRENCHES AND ADAPTERS • AIRCRAFT AND INDUSTRIAL UNIVERSAL JOINTS • SELF-RELEASING AND ADJUSTABLE STUD SETTERS • SAFETY FRICTION TAPPING CHUCKS • VERTICAL FLOAT TAPPING CHUCKS.

Market Briefs

cutbacks — Due largely to slack demand for silicon steels, Allegheny Ludlum Steel Corp. has cut back operations of its electric furnaces at Brackenridge, Pa., from 20 to 15 turns per week. An openhearth furnace has also been shut down. The cutbacks were effective about Feb. 1. A slowdown in its seamless tube mill forced Youngstown Sheet & Tube Co. to shut down three openhearth furnaces at the Brier Hill Works last Sunday.

still tight—Reported easing in the pressure for steel in some producing districts has not been felt in the Birmingham area. There is no slackening of demand in this district in sight. Steel warehouses and manufacturing concerns complain that CMP allotments are too small and they cannot get enough to meet their needs. And Birmingham's Committee of 100 announced recently that nine new plants for Birmingham could be announced immediately if structural steel and other building materials were available.

dead loss — American industry is losing $250,000,000 each year because of product loss or damage during shipment to consumers, according to Henry H. Pratt, general traffic manager of Crucible Steel Co. of America. He told the New York chapter of American Material Handling Society this week that this loss is due to inadequate packaging and production of products, incorrect and illegible marking, improper handling, and negligence by both shipper and carrier.

still tough — Steel mill crane builders continue to have trouble obtaining materials. THE IRON AGE, Dec. 13, 1951, p. 87.) This hurts output of cranes vital to steel expansion. Still scarce for the crane builders are straight roller bearings, hardened gears and pinions, worm gear units, castings, steel plates and structurals. Copper has improved somewhat. Industry says it is getting more help from Washington.

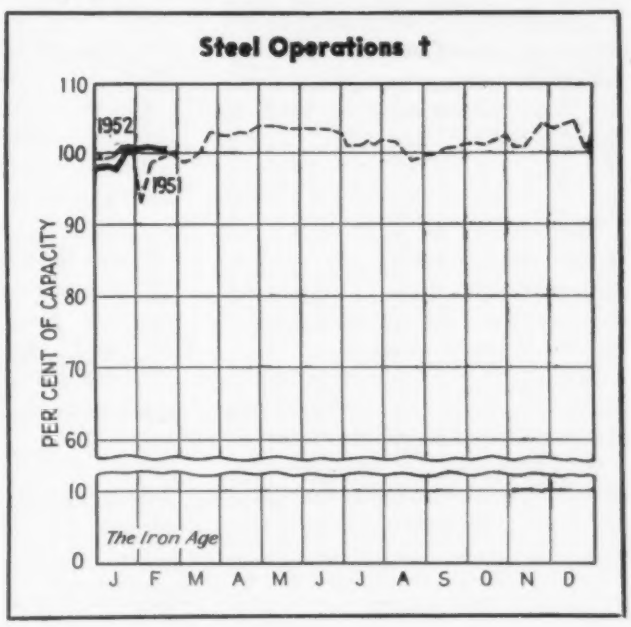
earnings—Two more steel companies have released preliminary reports of earnings. National Steel Co. reports net earnings for 1951 of $45,287,093. In 1950 the company's earnings were $57,814,974. Pittsburgh Steel Co. earned $7,331,613 in 1951, against $6,350,410 in 1950. (Earnings of other steel companies appeared in THE IRON AGE for Feb. 7, 1952, p. 99.)

boron use — The records show, according to National Production Authority, that use of boron-treated steels had increased from 26,000 tons in August to a probable 50,000 tons for February. Action is underway to see that warehouses are provided with enough boron steels to meet demand.

new mill — Aluminum fabricating facilities at its Listerhill, Ala., plant will be expanded at a cost of $2 million by Reynolds Metals Co. Construction will start immediately. The proposed mill will have 100,000 sq ft of floor space, devoted to manufacture of aluminum rods. Completion is scheduled for July.

not too bad—The troublesome blast furnace at Bethlehem Steel Co.'s Steelton plant was taken out of production early last week (see THE IRON AGE, Jan. 31, p. 141.) Luckily, the difficulties are not so serious as they might have been and the furnace is expected to be back in blast very shortly.

layoffs — Due to curtailment of aluminum for extrusion purposes, Aluminum Co. of America has laid off 200 workers at three extrusion plants. NPA has restricted the amount of aluminum that may be used for extrusions.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Feb. 3	101.0*	101.5	102.0	100.0	98.5	104.0	101.0	106.0	100.0	104.0	81.5	85.1	110.5	100.5
Feb. 10	102.0	101.5	99.0	100.0	102.0	104.0	101.5	103.0	100.0	104.0	89.0	77.5	93.6	100.0

† Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised.

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Shortages Force More Cutbacks

Three brass plants cut to 3 or 4-day work weeks . . . Alcoa lays off 200 at extrusion plants . . . Reynolds announces Gum Springs, Ark., as new 55,000-ton plant site—*By R. L. Hatschek.*

About 200 employees of Aluminum Co. of America have been laid off as a result of National Production Authority's cutback in aluminum extrusion. The workers were employed at Alcoa's Cressona and New Kensington, Pa., and Lafayette, Ind., extrusion plants. The company had attempted to maintain its work force but continued restrictions made it impossible.

More Brass Workers Off—American Brass Co. has also had to cut back work weeks to 3 and 4 days at its three Waterbury, Conn., plants. Others had previously made this step as a result of the copper shortage (see THE IRON AGE, Feb. 7, p. 208). All of these cutbacks can be attributed to the shortage plus the pattern of allocations coming from NPA. Some of these plants may be back to normal before the end of the month.

Aluminum Climbing—Bureau of Mines reports total 1951 production of 836,881 tons of aluminum, next to the highest annual total in the books. Output would have reached 844,000 tons if it hadn't been for the strike at the Troutdale smelter of Reynolds Metal Co.

But this total is nothing compared to what is on the way! Reynolds has finally announced the location of its earlier announced 55,000-ton-per-year Arkansas plant. The plant is to be situated at Gum Springs, near Arkadelphia, and is scheduled to go into initial production by the first of next year. Besides potroom buildings there will be an administrative building, a carbon electrode plant and a laboratory. Alumina will be supplied by Reynolds' Hurricane Creek Ark., plant.

Copper Trust? — International Materials Conference is in for more congressional blasting after a week of charge and rebuttal on IMC influence over availability of scarce items to U. S. industry. Senator Homer Ferguson, R. Mich., is worried about the copper shortage's effect on unemployment in his state and called it a "copper trust."

Representative George Meader, another Michigan Republican, asked for a House investigation of the State Dept., which has loaned personnel to IMC. State Dept.'s reply was that the U. S. was one of 28 nations participating in an attempt to prevent "fantastic competition." IMC has no authority to order any nation's action, only make recommendations.

Back IMC—Defense Production Administrator Fleischmann pointed out that IMC activities were the responsibility of himself and Defense Mobilizer Wilson, as far as domestic material requirements are concerned.

On the specific copper gripe, the DPA chief stated that neither the U. S. nor any other nation is getting its full allocation as a result of Chile's price demands. He believes that the price will soon drop and that some copper should soon be available from Rhodesia.

Have Signature—Both the lead and zinc tariff suspension bills have been passed in both houses of Congress and have received President Truman's signature. The President signed on Monday and the new laws went into effect Feb. 12. The trade was anxiously awaiting the move and now anticipates higher imports of the metals as a result.

Set '55 Lead Goal—DPA has set its sights on a 1955 lead supply of 1,220,000 tons, about 200,000 tons short of the estimated probable consumption of 1,420,000 tons, according to Ralph Trigg, deputy chief of the production agency. This calls for a boost of 165,000 tons over the 1949 supply from domestic mines and imports and allowing for scrap recovery.

Meanwhile, Defense Materials Procurement Agency has completed an agreement expected to provide 26,250 tons of Guatemalan pig lead over a 5-year period starting in 1954. Under the terms, Compania Minera de Huetenanga will expand facilities to the tune of $400,000. This includes construction of a 75-ton flotation mill and other facilities. The price will range from 17.342¢ to not more than 20.342¢ per lb.

Domestic Mines — Federal assistance is to be given for the opening of two new lead mines in Missouri and one in Idaho, to give a 38,000-ton lift to production rates. The Missouri mines will be St. Joseph Lead Co. and the Idaho mine, American Smelting & Refining Co.

NONFERROUS METAL PRICES

	Feb. 6	Feb. 7	Feb. 8	Feb. 9	Feb. 11	Feb. 12
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	....	$1.215	$1.215
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

Note: Quotations are going prices.

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 61.1¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 28, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 43.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 31.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 62-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in, $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 18.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 10,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ⅜ to ⅝ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅝, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76; 0.165 to 0.219, ⅞ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb.; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.30	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.13	36.74	37.99
Ni silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	50.00
Beryllium copper, 3.75-4.25% Be	1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium dollars per troy oz.	$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$203 to $207
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	88.00
Tin, New York	$1.215
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.20
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.3
13 alloy	20.3
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33⅝
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34⅝
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20⅝
Yellow brass	19½	17⅞
Red brass	20½	19⅝
Comm. bronze	20½	19⅝
Mang. bronze	18½	17⅝
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Maker's Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19⅛
No. 2 heavy copper and wire	17¼—17⅝
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14⅝
No. 1 composition	18 —18½
No. 1 composition turnings	17⅝—18
Unlined red car boxes	16⅝—17⅛
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15⅛

Aluminum

Alum. pistons and struts	6½— 7⅛
Aluminum crankcases	7½— 8
2S aluminum clippings	10⅛
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8

Zinc

New zinc clippings	13¼—13½
Old zinc	10 —10¼
Zinc routings	6¾— 7
Old die cast scrap	6¾— 7

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	15¾—16
Battery plates (dry)	10 —10½
Batteries, acid free	7 — 7¼

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	100 —110
No. 1 pewter	80
No. 1 auto babbitt	60
Mixed common babbitt	16¼—16½
Solder joints	22 —23
Siphon tops	60
Small foundry type	21 —22
Monotype	18½—19
Lino. and stereotype	17½—18
Electrotype	16 —16½
Hand picked type shells	10 —11
Lino. and stero. dross	8¾— 9
Electro. dross	7½— 8

UNIVERSITY OF MICHIGAN LIBRARIES

Cast Can Sell Below Ceiling Prices

Market for cast grades no longer soft . . . It's mushy . . . Under ceiling sales in various forms reported . . . Downgrading, tie-in sales, relaxed trucking charges reported in scrap centers.

The market for cast iron grades of scrap can no longer be called "soft." So much steam has hissed out of demand that the market is being turned "mushy." In most cases, the sanctity of ceiling prices is preserved by softened trucking charges, down-grading, and tie-in sales—but the effect is the same.

Dealers in a few areas now admit that even if foundries decided to invigorate their buying they could get cast at a nominal price below ceilings.

Foundries are being selective and in some scrap centers only good cast can move. In New York a downgrading case was reported. No. 1 cupola cast was sold as stoveplate. In the same area buyers were reported trying to lower dealers' trucking charges — or even get them dropped.

The first signs of cast demand's downfall were given in the summer of 1951. Hot weather that slowed foundry operations and a slip in business were the cause. Many in the scrap industry believed that the lull was temporary and that the fall of '51 would see cast beating its chest once again.

It never happened. Foundry business reflected civilian production cutbacks and as yet not enough defense work has been placed to fill the breach. Some dealers tried to pump strength into their market by stockpiling cast. But now it appears that this strategy can be successful only if the market picks up its own natural momentum later. There's a saturation point to stockpiling.

It also ties up capital and takes up yard space. In a period when mechanization is a necessity, capital is better invested than stored in the dealer's yard.

In Pittsburgh, tie-in sales of scrap and openhearth material can be made. The mill involved will take some cast to get the openhearth material. In St. Louis, some cast is being sold by railroads f.o.b. St. Louis instead of on-line. In effect, this is a below-ceiling sale. Boston scrap people feel that scrap is a "drug on the market."

Pittsburgh—The market has lost some of its urgency. So-called electric furnace scrap and cast scrap are easier. But good electric furnace material and openhearth grades continue in tight supply. Dealers are showing signs of uneasiness, and some are trying to protect themselves with long-term contracts (usually 90 days) at existing monetary terms. Electric furnace melt shops are tightening up on inspection. Material they would have accepted several weeks ago is being rejected. It is now possible to make "deals" on cast purchases—for example, a dealer can be induced to sell two cars of openhearth material for each car of cast scrap bought. Material generally is moving more freely.

Chicago—After a slight loosening last week, the scrap market tightened, reflecting a movement indicated in the South last week. Cast iron continued to be soft, with all other grades continuing high and dealers reporting demand steady. Mills reported stock still low, but are holding their own with scrap collections aided by good weather.

Philadelphia — Electric furnace grades show further softening this week and several consumers are out of the market. This is having an effect on openhearths as well and mills are getting more quality-conscious, according to local dealers. There have been some rejections of steel grades lately. Activity of auto wreckers is definitely on the upswing.

New York—Openhearth scrap is still in heavy demand. A little of the desperation has leaked out of the buying, though. Cast is now more than soft. It's mushy. Some sales at below ceiling prices have been reported but there is always trimming to preserve the sanctity of the OPS order. A foundry order for stove plate may turn up as No. 1 cupola—or trucking charges may be dropped.

Cleveland—The market here shows no sign of an immediate easing. One consumer is still on allocation. Dealers' yards still have that vacant look, and tonnage of unprepared scrap is skimpy. As one broker put it, "real electric furnace scrap just ain't." Also, good cast continues to move without difficulty. Material is moving more freely as some dealers, noting an easier tone in other markets, are shiping more readily to protect themselves.

St. Louis—Favorable weather in this area has improved the scrap picture, resulting in an improvement in the inventories of steel mills here. Foundry grades continue in poor demand, and some cast items are being sold by railroads at below ceiling prices by selling f.o.b. St. Louis instead of on line.

Birmingham—Fair supplies of most grades of scrap continue to come into the district but, unlike a week ago, much of it is being allocated to mills in this area instead of to northern plants. Scrap drives in several localities are getting results and farmers, home chores finished, are bringing in more scrap to dealers. The cast market continues easy, with little buying.

Cincinnati—A strike at Newport Steel Corp. prevented delivery of scrap to mill yards last week. Since all scrap in this area has been under allocation to Newport the strike brought a temporary easiness to the market. Some dealers received permission to ship out of the district.

Boston—Cast iron has turned out to be a drug on the market here. Mills refuse to buy unless the grades are exceptional. Pipe and pipe companies appear to be well supplied.

Buffalo — Dealers here report increased shipments to mills. Immediate threat to production seems to have lifted. New allocations are going to local mills. Cast was soft.

Ferroalloy Prices

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va.	$185
Ashtabula, O.	$187
F.o.b. Johnstown, Pa.	$185
F.o.b. Sheridan, Pa.	$188
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn, $2.15 penalty, $2.15 for each 1% below 78%. Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	75.00	76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	34.75
Ton lots	36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn.....19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silcon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carload, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

15% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.1% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si	21.25	23.10	24.30

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carload	9.90¢
Ton lots	11.30¢

Calcium molybdate, 46.3-46.6%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.15

Other Ferroalloys

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton

	$65.00
10 tons to less carload	75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	$1.50
Less ton lots	1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $5.00

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.

	$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢

Vanadium pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Ton lots	21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.

Carload, bulk	7.00¢

Boron Agents

Contract prices per lb of alloy, del. Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots, per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.20

F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.

No. 1	$1.00
No. 6	68¢
No. 79	50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe. 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

Ton lots	$1.46
Less ton lots	1.57

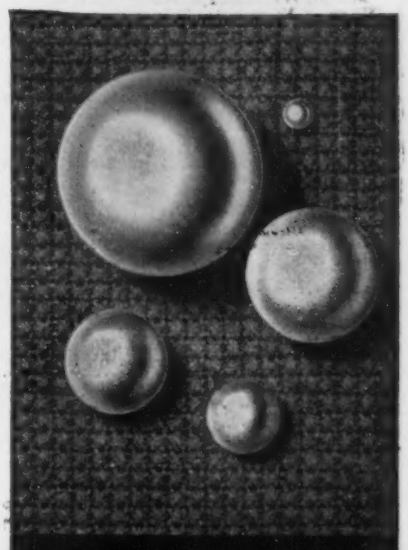
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.

Less ton lots	$1.80

Silcaz, contract basis, delivered.

Ton lots	45.00¢

a metal ball PROBLEM?



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Ingersoll Rand 33" x 20½" x 24" Complete with 635 H.P. G.E. Syn. Motor 2300/3/60
2873 cu. ft. Worthington 29" x 21" x 18½" x 21". Complete with Elec. Equipment.

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¾" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment and numerous dies
No. 3 Blue Valley Flanging Machine. Will flange flat heads from 48" to 10' or 12' dia. Silent chain drive with A.C. Motor. Equipped with air cylinder and hydraulic pump

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2" AJAX Upsetting and Forging Machine

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400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.
15 ton Heroult Model V-12 Electric Melting Furnace, Top Charge hydraulically operated. Complete with Transformer Equipment

HAMMER—STEAM FORGING
6000 lb. Chambersburg Steam Forging Hammer Guided Ram, 21" Bore, 60" Stroke

PLANERS
48" x 48" x 12' Niles-Bement-Pond, Four Head
60" x 60" x 12' Niles-Bement-Pond, Four Head
72" x 72" x 12' Niles-Bement-Pond, Four Head

PLATING PLANT
Crown Automatic Nickel & Chrome Plating Unit, 48" Depth of Tanks, Complete with Plating Solution Tester, Generator, Rectifier, Pump all Elecl. Equip., etc.

ROLLING MILLS
12½" x 16" Philadelphia Two High Cold Rolling Mill, Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coiler
18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill, Complete with Elec. Equip.

STRAIGHTENERS
No. 6 Kane & Roach 8-Roll Bar, Angle & Shape Straightener, Motor Driven. Capacity 5 x 5 x ⅝" Angles 6" x 1" Flats, 2¾" Square, etc.
7-Roll DECo Shape Straightener, Arr. Geared Motor Drive. Capacity ¾ x ¾ x ⅛" to 1½ x 1½ x 3/16" Angles, ⅜ x 3" Flats, also bars, channels, beams, etc.

TESTING MACHINES
20,000# Southwark S10C Universal Hydr. Testing Machine
300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine

TRIMMING LINE
#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys ⅛" max. Trimmed width 22" min. 66" max. Scrap Length ¾" min. 2¼" max.

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No. 7 Ryerson Kling Universal Ironworker with Coper. Capacity Punch 1 5/16" thru 1", Shear ¾" Plate, 2¼" Round 2" Square 6x6x½" Angles, Complete with Elecl. Equip.

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700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 6" to 35" Diameter x 12" Wide
40 KVA Sciaky, Spot Welder, 36" Throat 440/3/60 operation

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Pittsburgh Market — The outlook for used and rebuilt equipment in the Pittsburgh district continues sound. Dealers here have closed one of the busiest years in their history and are optimistic about the prospects in 1952.

Demand for steel mill equipment is still potent and it points up the difficult part of doing business today — locating desirable equipment to fill that demand. Contacts built up during the years are now paying off in this respect.

More Late Stuff — Some Pittsburgh machine tool dealers note a slight improvement in the availability of relatively recent equipment. This improvement is nothing sensational but it does relieve the monotony, however slightly. The cats and dogs are plentiful, as usual, but asking prices are too high to match up to demand.

Parts procurement is a knotty problem in Pittsburgh. For example, one dealer has waited nearly 4 months for a vital part. Delivery on the machine was held up for that time. Machine parts area genuinely distressing bottleneck.

Cranes — Pittsburgh inquiries on cranes are still plentiful, revealing the tempo of industry expansion, but dealers are unable to balance supply to demand. Standard cranes have virtually disappeared from the market. Now available in this district are a few bucket cranes, some smaller cranes, one 75-ton ladle crane. Another 75-ton ladle crane may be released for sale shortly.

Demand for electrical equipment shows a lot of strength. Transformers and large motor generator sets are snapped up as quickly as they are unearthed. Chief reason for this is extended delivery on new equipment. Motor generator sets, for instance, are being quoted for delivery 18 to 24 months hence.

Cleveland Market — In Cleveland, some sources in the used machinery industry report an increasing number of inquiries from large defense plants in the area for older vintage used machine tools. They attribute this relaxing to the fact that large plants are unable to get new or late type used equipment and are finally lowering their standards a notch.

Some sources expect a pickup in the sales of older tools with the acceleration of defense work but do not believe this new demand will be a landslide.

Type of Demand—The reported inquiries for older machine tools in Cleveland come mostly for surface grinders, turret lathes, and vertical milling machines. Greater interest is also being shown in older types of sheet metal equipment, such as press brakes and shears. Small grinding shops are said to be on the lookout for grinders to fill out their capacity.

Although it may seen that the tendency to move more older machine tools is heightening (inquiries in Cleveland are reportedly picking up) there does not seem to be as yet any appreciable increase in actual sales.

Defense Work — Smaller manufacturers, most likely market for these not-so-young tools, do not have enough defense contracts to make them active purchasers. It seems, though, that smaller manufacturers are scouting the market and perhaps laying the groundwork for future deals.

Economy-minded small plants have in the past purchased older types of machine tools for their production. But now the used machinery field has partially lost this market because the small plant owner faced with cutbacks in materials does not have the means to maintain high civilian production. And yet the small plant is not into defense work deeply enough to buy older tools.